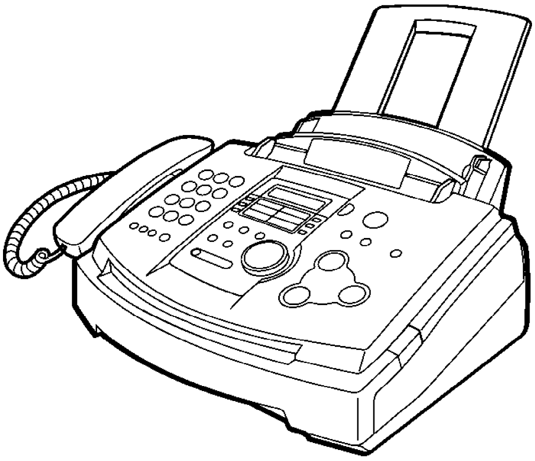
ORDER NO. KMF0108507C1
F7

Service Manual

Multi-Function Laser Fax

KX-FLM551

(for U.S.A.)



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⚠ WARNING

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

Panasonic

When you note the serial number,write down all 11 digits. The serial number may be found on the bottom of the unit.

1. INTRODUCTION

1.1. SAFETY PRECAUTIONS

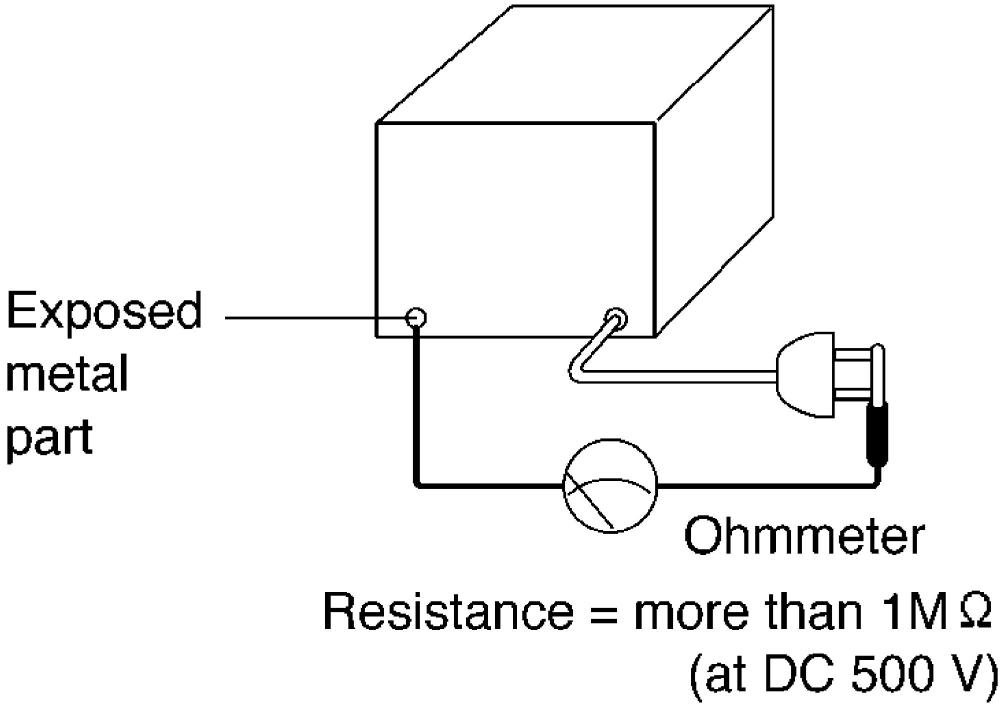
1. **Before servicing, unplug the AC power cord to prevent an electric shock.**
2. **When replacing parts, use only the manufacturer's recommended**

components.

3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc.
5. Before returning the serviced equipment to the customer, be sure to perform the following insulation resistance test to prevent the customer from being exposed to shock hazards.

1.2. INSULATION RESISTANCE TEST

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part (screw heads, control shafts, bottom frame, etc.).
   Note: Some exposed parts may be isolated from the chassis by design. These will read infinity.
4. If the measurement is outside the specified limits, there is a possibility of a shock hazard.



1.3. FOR SERVICE TECHNICIANS

ICs and LSIs are vulnerable to static electricity.
When repairing, the following precautions will help prevent recurring malfunctions.

1. **Cover the plastic part's boxes with aluminum foil.**
2. **Ground the soldering irons.**
3. **Use a conductive mat on the worktable.**
4. **Do not touch the IC or LSI pins with bare fingers.**

1.4. BATTERY CAUTION

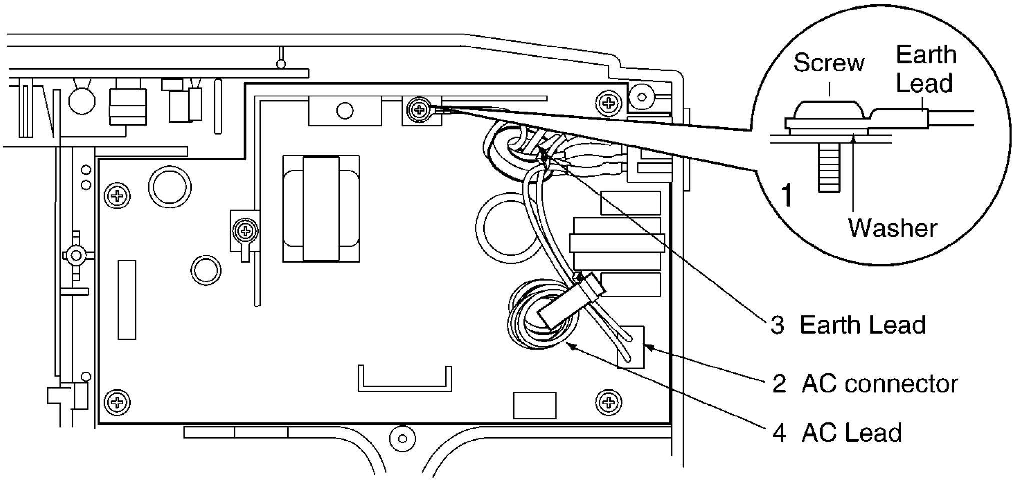
CAUTION

Danger of explosion if the battery is replaced incorrectly. Replace only with the same or equivalent type recommended by the manufacturer. Discard used batteries according to following caution :
Disposal of lithium batteries should be performed by permitted, professional disposal firms knowledgeable in state government federal and local hazardous materials and hazardous waste transportation and disposal requirements.
A battery continues to have no transportation limitations as long as it is separated to prevent short circuits and packed in strong packaging.
Commercial firms that dispose of any quantity of lithium cells should have a mechanism in place to account for their ultimate disposition. This is a good practice for all types of commercial or industrial waste.
Recommend Type Number:
CR2032 (BAT501) Manufactured by MATSUSHITA
CR2032 (BAT501) Manufactured by SONY

1.5. AC CAUTION

For safety, before closing the lower cabinet, please make sure of the following precautions.

1. **The earth lead is fixed with the screw.**
2. **The AC connector is connected properly.**
3. **Wind the earth lead around the core 5 times.**
4. **Wind the earth AC around the core 4 times.**

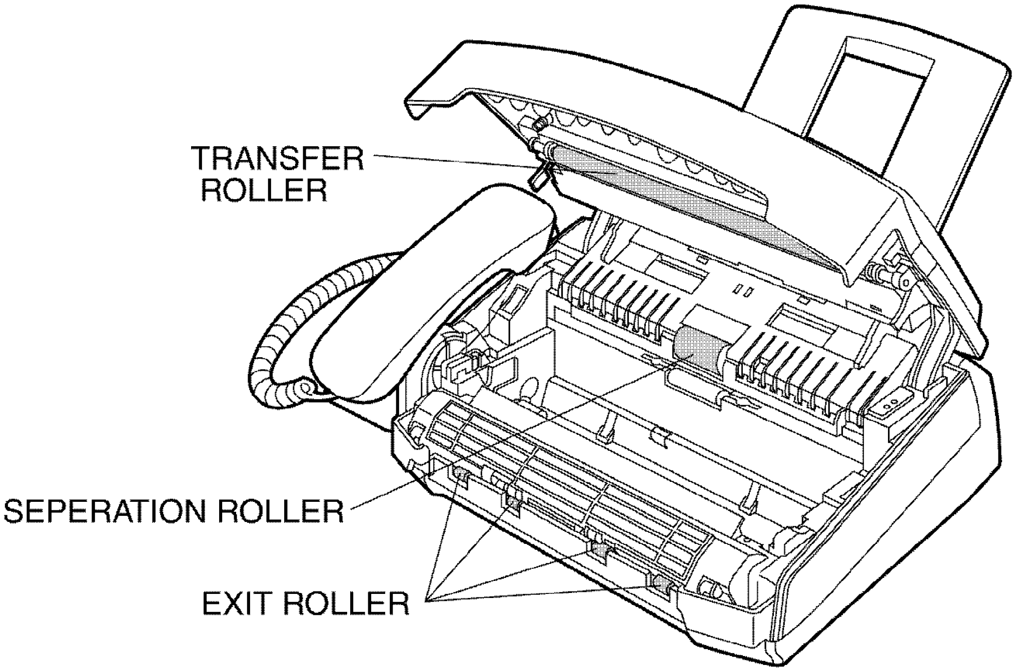

Screw
Earth Lead
1
Washer
3 Earth Lead
2 AC connector
4 AC Lead

1.6. PERSONAL SAFETY PRECAUTIONS

1.6.1. MOVING SECTIONS OF THE UNIT

Be careful not to let your hair, clothes, fingers, accessories, etc., become caught in any moving sections of the unit.

The moving sections of the unit are the rollers and a gear. There is a separation roller and a document feed roller which are rotated by the document feed motor. A gear rotates the two rollers. Be careful not to touch them with your hands, especially when the unit is operating.

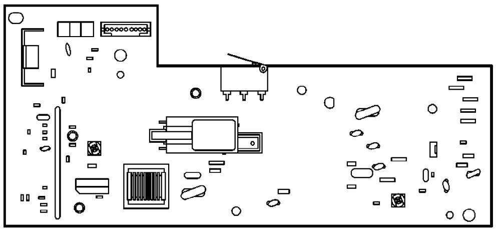

TRANSFER ROLLER
SEPERATION ROLLER
EXIT ROLLER

1.6.2. LIVE ELECTRICAL SECTIONS

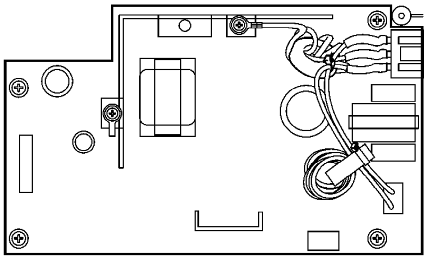
All the electrical sections of the unit supplied with AC power by the AC power cord are live. Never disassemble the unit for service with the AC power supply plugged in.

CAUTION:

AC voltage is supplied to the primary side of the power supply unit. Therefore, always unplug the AC power cord before disassembling for service.



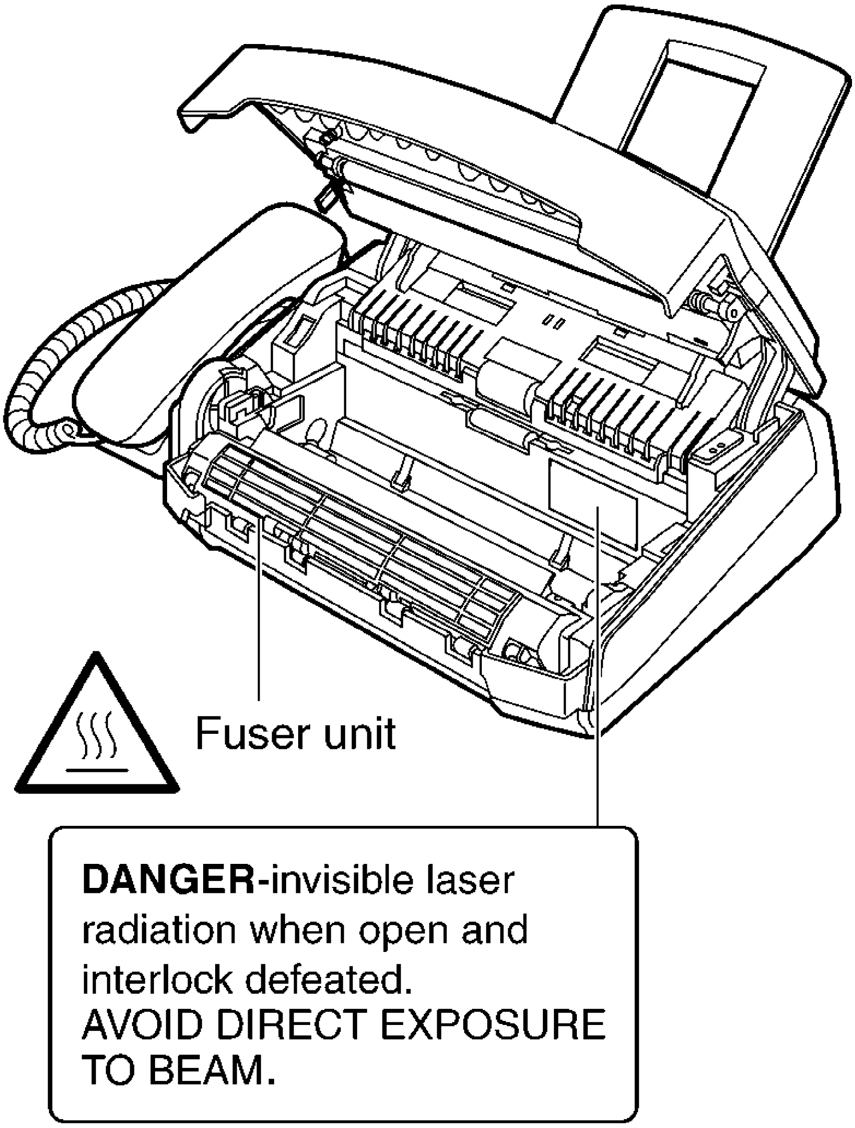
High Voltage Power Supply Board



Low Voltage Power Supply Board

1.6.3. LASER BEAM SECTION

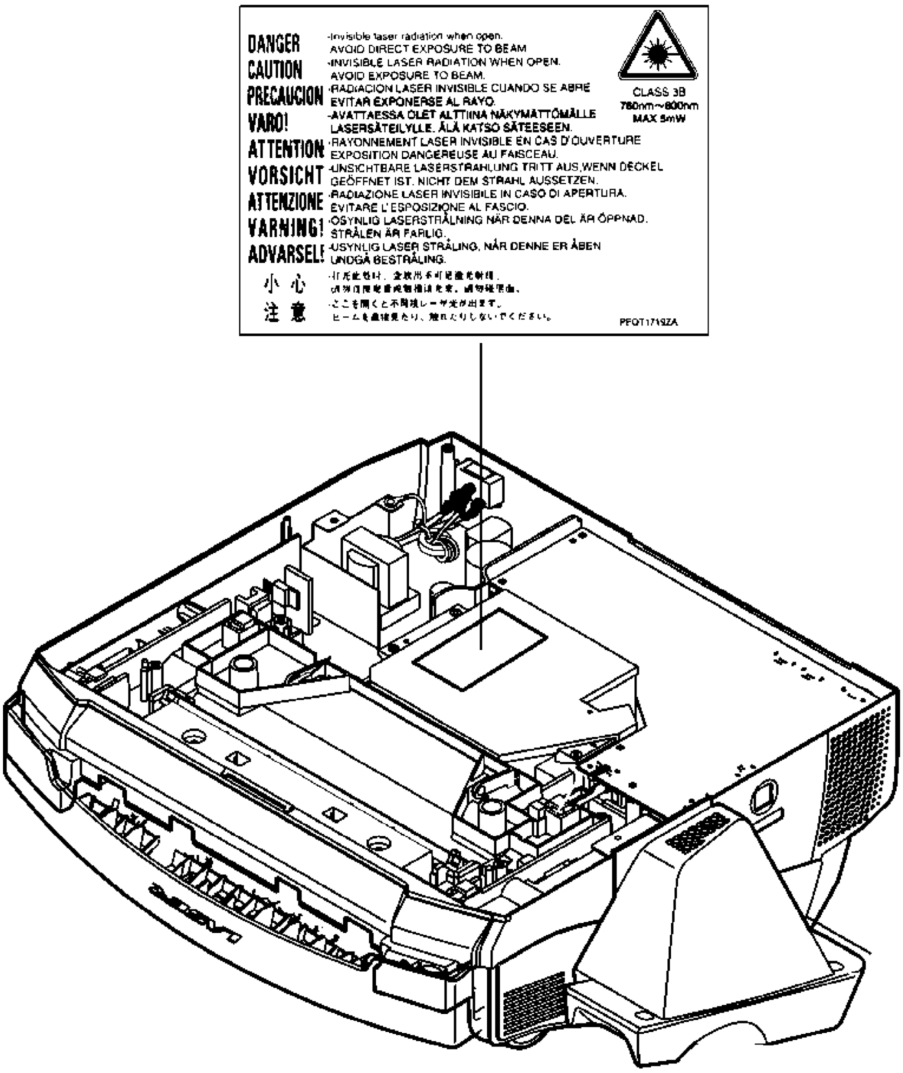
The printer of this unit utilises a laser. Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.



DANGER-invisible laser radiation when open and interlock defeated.
AVOID DIRECT EXPOSURE TO BEAM.

Fuser unit

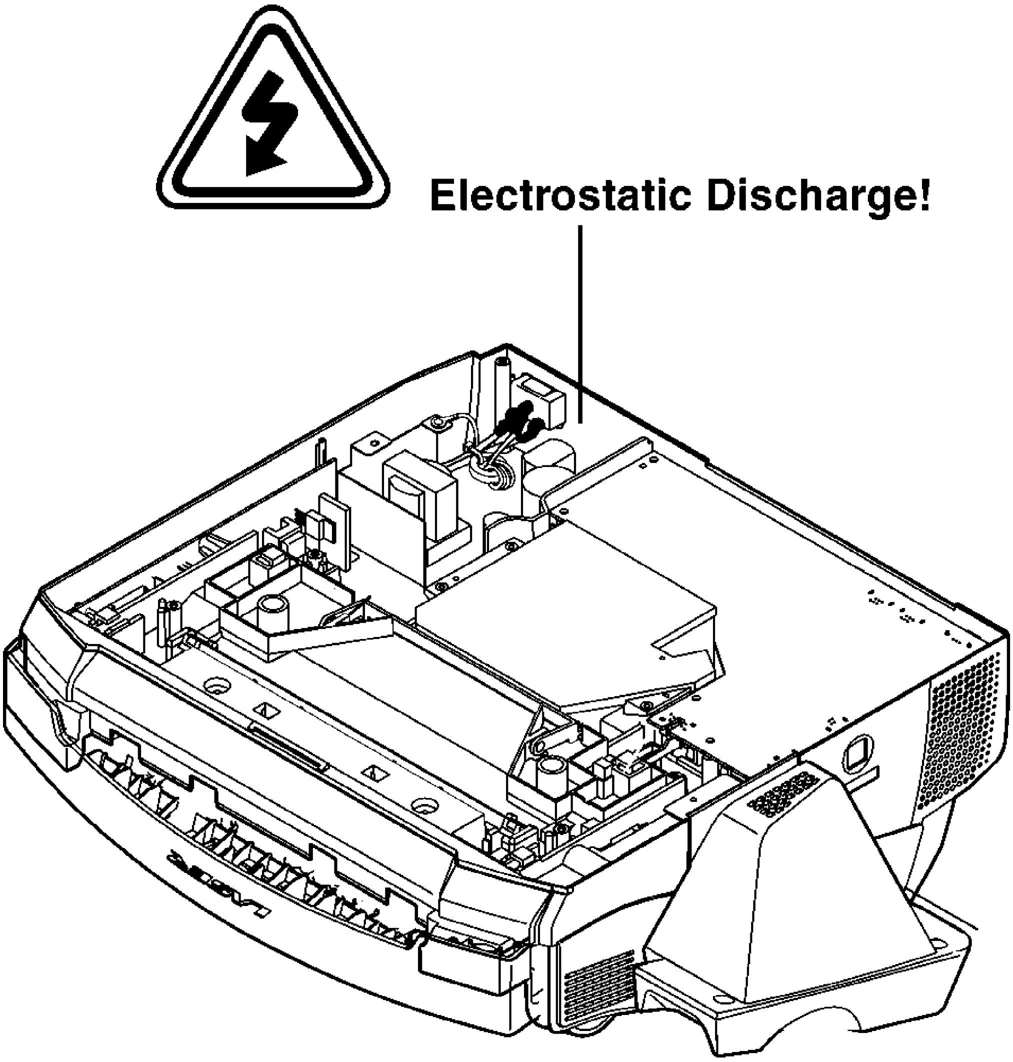
- The fuser unit gets hot, Do not touch it.


DANGER
-Invisible laser radiation when open.
AVOID DIRECT EXPOSURE TO BEAM
CAUTION
-INVISIBLE LASER RADIATION WHEN OPEN.
AVOID EXPOSURE TO BEAM.
PRECAUCION
-RADIACION LASER INVISIBLE CUANDO SE ABRE
EVITAR EXPONERSE AL RAYO.
VARO!
-AVATTAESSA OLET ALTTIINA NÄKYMÄTTÖMÄLLE
LASERSÄTEILYLLE. ÄLÄ KATSO SÄTEESEEN.
ATTENTION
-RAYONNEMENT LASER INVISIBLE EN CAS D'OUVERTURE
EXPOSITION DANGEREUSE AU FAISCEAU.
VORSICHT
-UNSICHTBARE LASERSTRAHLUNG TRITT AUS,WENN DECKEL
GEÖFFNET IST. NICHT DEM STRAHL AUSSETZEN.
ATTENZIONE
-RADIAZIONE LASER INVISIBILE IN CASO DI APERTURA.
EVITARE L'ESPOSIZIONE AL FASCIO.
VARNING!
-OSYNLIG LASERSTRÅLNING NÄR DENNA DEL ÄR ÖPPNAD.
STRÅLEN ÄR FARLIG.
ADVARSEL!
-USYNLIG LASER STRÅLING, NÅR DENNE ER ÅBEN
UNDGÅ BESTRÅLING.
小心
注意
-ここを開くと不可視レーザ光が出ます。
ビームを直接見たり、触れたりしないでください。
CLASS 3B
780nm~800nm
MAX 5mW
PFQT1719ZA

1.7. SERVICE PRECAUTIONS

1.7.1. PRECAUTIONS TO PREVENT DAMAGE FROM STATIC ELECTRICITY

Electrical charges accumulate on a person. For instance, clothes rubbing together can damage electric elements or change their electrical characteristics. In order to prevent static electricity, touch a metallic part that is grounded to release the static electricity. Never touch the electrical sections such as the power supply unit, etc.


Electrostatic Discharge!

1.8. FEATURES

General

- **Help function**

  Please refer to WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION.() to print below features.

  Display:

1. **QUICK SET UP**
2. **FEATURE LIST**
3. **JOG/AUTO DIAL**
4. **FAX SND/RCV**
5. **COPIER**
6. **Q and A**
7. **ERRORS**
8. **REPORTS**

9. CALLER ID

- LCD (Liquid Crystal Display) readout
- TAM (Telephone answering machine) interface

Plain Paper Facsimile Machine

- 8 second transmission speed *
- Letter/A4/Legal, G3 compatible
- Automatic document feeder (15 sheets)
- Quick scan
- Resolution: Standard/Fine/Super fine/Photo (64 level)
- STANDARD: For printed or typewritten originals with normal-sized characters.
- FINE: For originals with small printing.
- SUPER FINE: For originals with minute printing.
- PHOTO: For originals containing photograph.
- Broad cast with Jog-Dial
- 150-sheet paper capacity (60 g/m2~ 75 g/m2[16 lb~20 lb.])
- Distinctive ring detection **

* The 8 second speed is based upon the ITU-T No. 1 Test Chart on the condition that memory transmission is performed.

** Subscription to distinctive ring services is required.

Large Memory ... Performed by DRAM
Approx. 150 pages of memory reception
Approx. 150 pages of memory transmission

Integrated Telephone System

- On-hook dialing
- Monitor speaker
- Voice muting
- Redialing function
- 100-Station telephone directory with Jog Dial

Enhanced Copier Function

- Multi-copy function (up to 99 copies)
- Enlargement and reduction
- Collate
- 64-Level halftone

1.9. SPECIFICATIONS

Applicable Lines:

Public Switched Telephone Network

Document Size:

Max. 216 mm (8 1/2") in width
Max. 600 mm (23 5/8") in length

Effective Scanning Width:

208 mm (8 3/16")

Effective Printing Width:

208 mm (8 3/16")

Transmission Time*:

Approx. 8 s/page (ECM-MMR)**

Scanning Density:

Horizontal:
8 pels/mm (203 pels/inch)
Vertical:
3.85 lines/mm (98 lines/inch)—STANDARD
7.7 lines/mm (196 lines/inch)—FINE/PHOTO
15.4 lines/mm (392 lines/inch)—SUPER FINE

Halftone Level:

64-level

Scanner Type:

Contact Image Sensor (CIS)

Printer Type:

Laser beam printer

Data Compression System:

Modified Huffman (MH), Modified READ (MR), Modified Modified READ (MMR)

Modem Speed:

14,400/12,000/9,600/7,200/4,800/2,400 bps; Automatic Fallback

Operating Environment:

10°C—32.5°C (50°F—90.5°F), 20—80% RH (Relative Humidity)

Dimensions (H×W×D):

190 mm × 417 mm × 345 mm (7 1/2"×16 2/5"×13 3/5")

Mass (Weight):

Approx. 6.5 kg (14.3 lb.)

Power Consumption:

Standby: Approx. 6 W
Transmission: Approx. 25 W
Reception: Approx. 200 W
Copy: Approx. 200 W
Maximum: Approx. 560 W (When the fuser unit turns on)

Power Supply:

120 V AC, 60 Hz

Memory Capacity:

Approx. 150 pages of memory transmission/reception/copy.
(Based on ITU-T No. 1 Test Chart in standard resolution.)

Laser diode properties:

Laser output: Max. 5 mW
Wave length: 760 nm—800 nm
Emission duration: Continuous

Print Speed:

10 ppm (page per minute)

Printing Resolution:

600 × 600 dpi

Compatible OS:

Windows 95/98/Me/2000

Interface:

USB/Parallel (IEEE 1284)

*** Transmission speed depends upon the contents of the pages, resolution, telephone line conditions and capability of the other party’s machine.**

**** Transmission speed is based upon the ITU-T No. 1 Test Chart and original mode. (Refer to ITU-T No.1 TEST CHART().) If the capability of the other party's machine is inferior to your unit, the transmission time may be longer.**

Note:

- Any details given in these instructions are subject to change without notice.

- The pictures and illustrations in these instructions may vary slightly from the actual product.

Design and specifications are subject to change without notice.

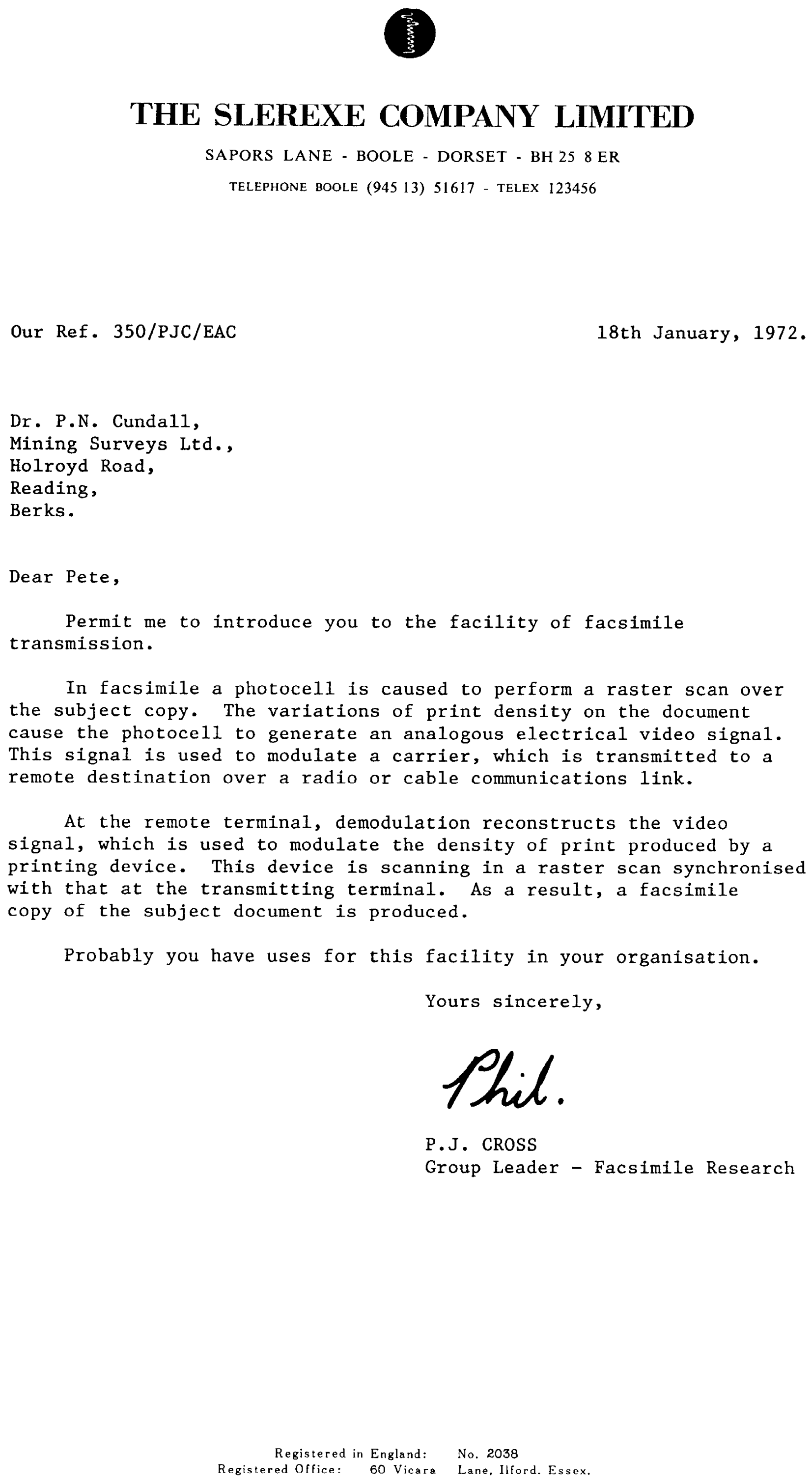
1.10. OPTIONAL ACCESSORIES

Model No.	Description	Specifications
KX-FA76	Toner cartridge	1 toner cartridge
KX-FA77D	Drum unit	1 drum unit

***Do not replace Model No. KX-FA77(Without “D”). It dose not apply for this fax machine.**

1.11. TEST CHART

1.11.1. ITU-T No.1 TEST CHART



THE SLEREXE COMPANY LIMITED
SAPORS LANE - BOOLE - DORSET - BH 25 8 ER
TELEPHONE BOOLE (945 13) 51617 - TELEX 123456

Our Ref. 350/PJC/EAC 18th January, 1972.

Dr. P.N. Cundall,
Mining Surveys Ltd.,
Holroyd Road,
Reading,
Berks.

Dear Pete,

Permit me to introduce you to the facility of facsimile transmission.

In facsimile a photocell is caused to perform a raster scan over the subject copy. The variations of print density on the document cause the photocell to generate an analogous electrical video signal. This signal is used to modulate a carrier, which is transmitted to a remote destination over a radio or cable communications link.

At the remote terminal, demodulation reconstructs the video signal, which is used to modulate the density of print produced by a printing device. This device is scanning in a raster scan synchronised with that at the transmitting terminal. As a result, a facsimile copy of the subject document is produced.

Probably you have uses for this facility in your organisation.

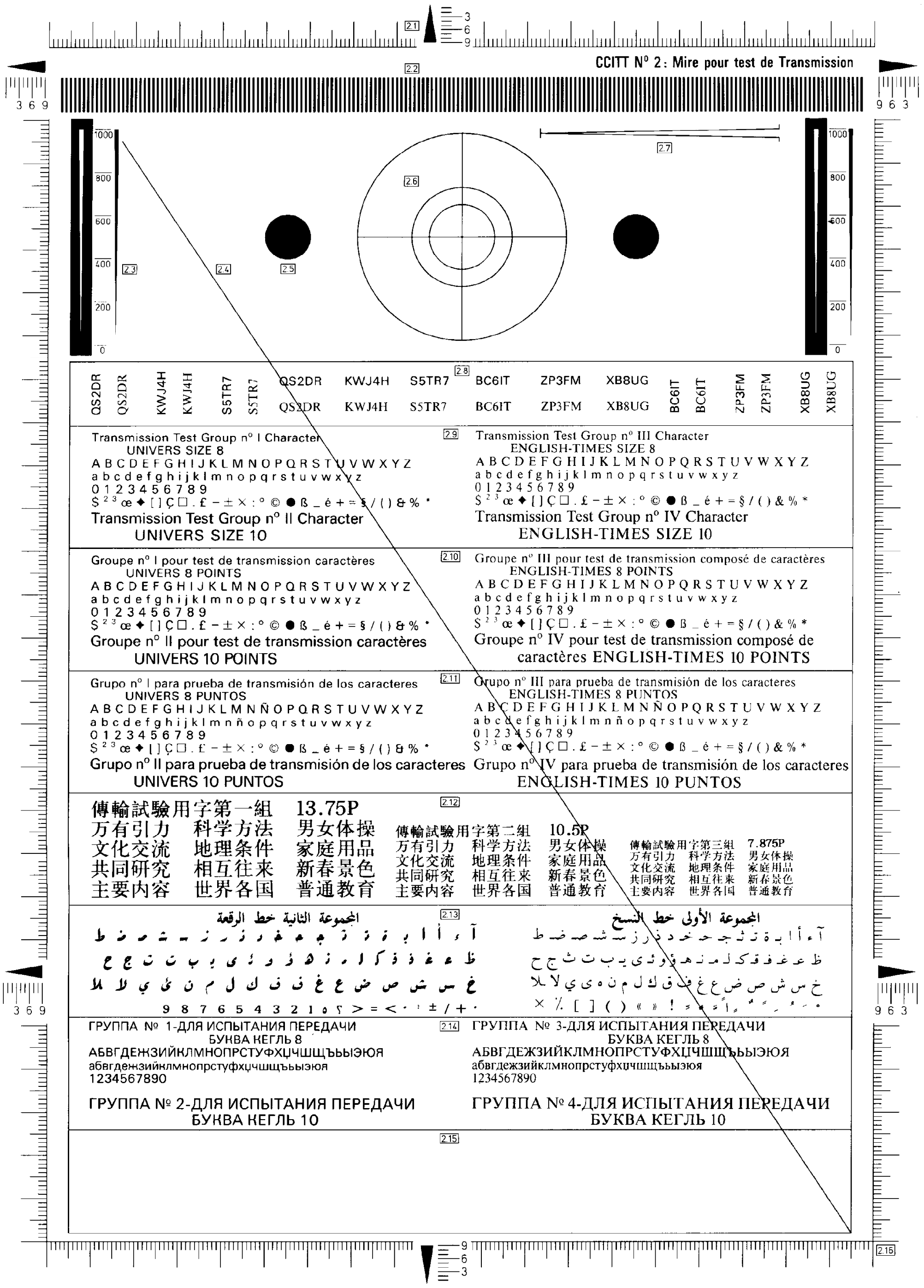
Yours sincerely,

Phil.

P.J. CROSS
Group Leader - Facsimile Research

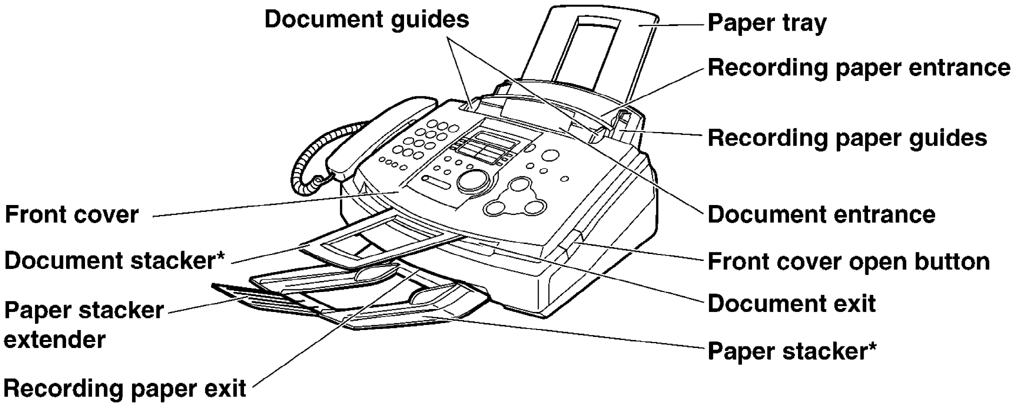
Registered in England: No. 2038
Registered Office: 60 Vicara Lane, Ilford. Essex.

1.11.2. ITU-T No.2 TEST CHART


CCITT N° 2 : Mire pour test de Transmission
Transmission Test Group n° I Character UNIVERS SIZE 8
Transmission Test Group n° II Character UNIVERS SIZE 10
Transmission Test Group n° III Character ENGLISH-TIMES SIZE 8
Transmission Test Group n° IV Character ENGLISH-TIMES SIZE 10
Groupe n° I pour test de transmission caractères UNIVERS 8 POINTS
Groupe n° II pour test de transmission caractères UNIVERS 10 POINTS
Groupe n° III pour test de transmission composé de caractères ENGLISH-TIMES 8 POINTS
Groupe n° IV pour test de transmission composé de caractères ENGLISH-TIMES 10 POINTS
Grupo n° I para prueba de transmisión de los caracteres UNIVERS 8 PUNTOS
Grupo n° II para prueba de transmisión de los caracteres UNIVERS 10 PUNTOS
Grupo n° III para prueba de transmisión de los caracteres ENGLISH-TIMES 8 PUNTOS
Grupo n° IV para prueba de transmisión de los caracteres ENGLISH-TIMES 10 PUNTOS
ГРУППА № 1-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ БУКВА КЕГЛЬ 8
ГРУППА № 2-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ БУКВА КЕГЛЬ 10
ГРУППА № 3-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ БУКВА КЕГЛЬ 8
ГРУППА № 4-ДЛЯ ИСПЫТАНИЯ ПЕРЕДАЧИ БУКВА КЕГЛЬ 10

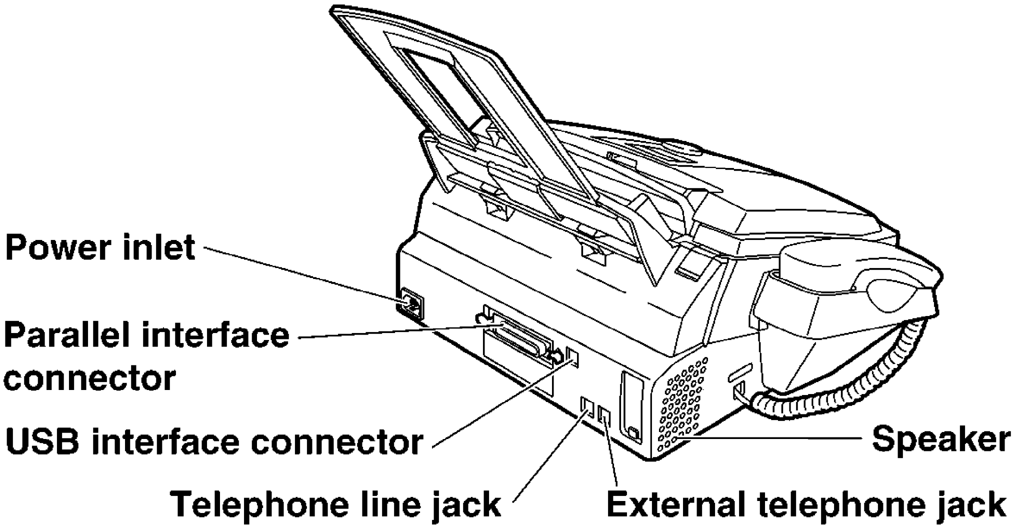
1.12. LOCATION OF CONTROLS

1.12.1. OVERVIEW

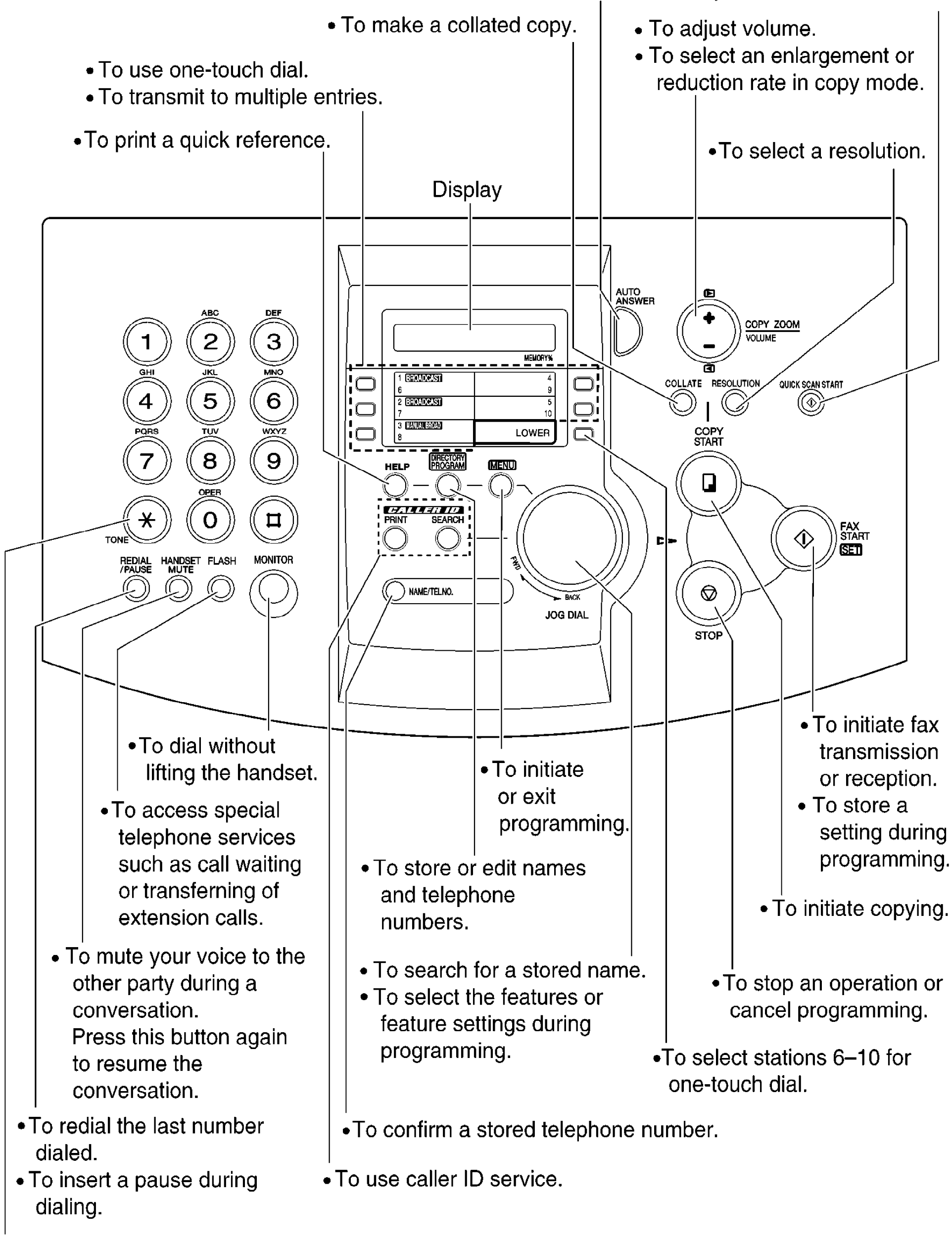

Document guides
Paper tray
Recording paper entrance
Recording paper guides
Front cover
Document entrance
Document stacker*
Front cover open button
Paper stacker
extender
Document exit
Paper stacker*
Recording paper exit

Note:
***The document stacker and paper stacker may not be shown in all illustrations.**

1.12.2. Rear view


Power inlet
Parallel interface
connector
USB interface connector
Speaker
Telephone line jack
External telephone jack

1.12.3. CONTROL PANEL


Display
ABC
DEF
1
2
3
GHI
JKL
MNO
4
5
6
PQRS
TUV
WXYZ
7
8
9
OPER
*
0
#
TONE
REDIAL /PAUSE
HANDSET MUTE
FLASH
MONITOR
MEMORY%
BROADCAST
BROADCAST
MANUAL BROAD
LOWER
HELP
DIRECTORY PROGRAM
MENU
CALLER ID
PRINT
SEARCH
NAME/TEL.NO.
FWD
BACK
JOG DIAL
AUTO ANSWER
COPY ZOOM
VOLUME
COLLATE
RESOLUTION
QUICK SCAN START
COPY START
FAX START
SET
STOP

- To turn on/off AUTO ANSWER.
- To store a scanned document into memory, and then send it .
- To make a collated copy.
- To adjust volume.
- To select an enlargement or reduction rate in copy mode.
- To use one-touch dial.
- To transmit to multiple entries.
- To print a quick reference.
- To select a resolution.
- To dial without lifting the handset.
- To initiate or exit programming.
- To initiate fax transmission or reception.
- To store a setting during programming.
- To access special telephone services such as call waiting or transferring of extension calls.
- To store or edit names and telephone numbers.
- To initiate copying.
- To mute your voice to the other party during a conversation. Press this button again to resume the conversation.
- To search for a stored name.
- To select the features or feature settings during programming.
- To stop an operation or cancel programming.
- To select stations 6–10 for one-touch dial.
- To redial the last number dialed.
- To insert a pause during dialing.
- To confirm a stored telephone number.
- To use caller ID service.
- To change from pulse to tone temporarily during dialing when your line has rotary pulse services.

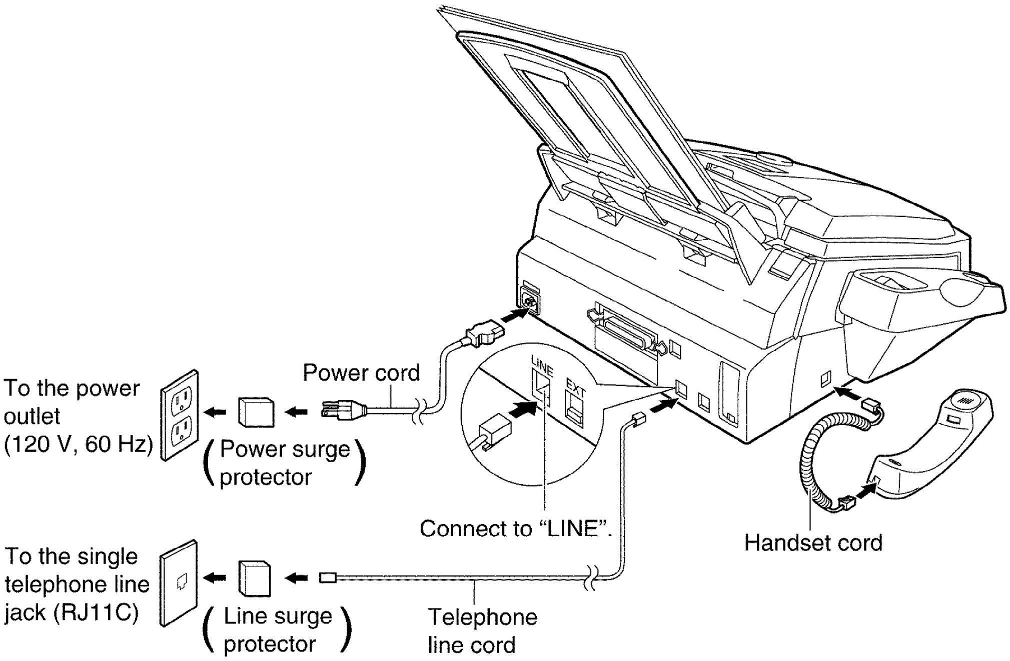
1.13. CONNECTIONS

(1) Connect the handset cord.

(2) Connect the telephone line cord.

(3) Connect the power cord.

- When the power is turned on for the first time, the unit will print some basic information.


To the power outlet (120 V, 60 Hz)
Power cord
Power surge protector
LINE
EXT
Connect to "LINE".
Handset cord
To the single telephone line jack (RJ11C)
Line surge protector
Telephone line cord

Note:

- **The warranty does not cover damage due to power line surges or lightning. For additional equipment protection, we recommend the use of a surge protector. The following types are available; TELESPIKE BLOK MODEL TSB (TRIPPE MFG. CO.), SPIKE BLOK MODEL SK6-0 (TRIPPE MFG. CO.), SUPER MAX (PANAMAX) or MP1 (ITW LINX).**
  The warranty does not cover damage due to power line surges or lightning.
- **When you operate this product, the power outlet should be near the product and easily accessible.**
- **You can connect an answering machine or extension telephone to the external telphone jack (EXT) on this unit.**

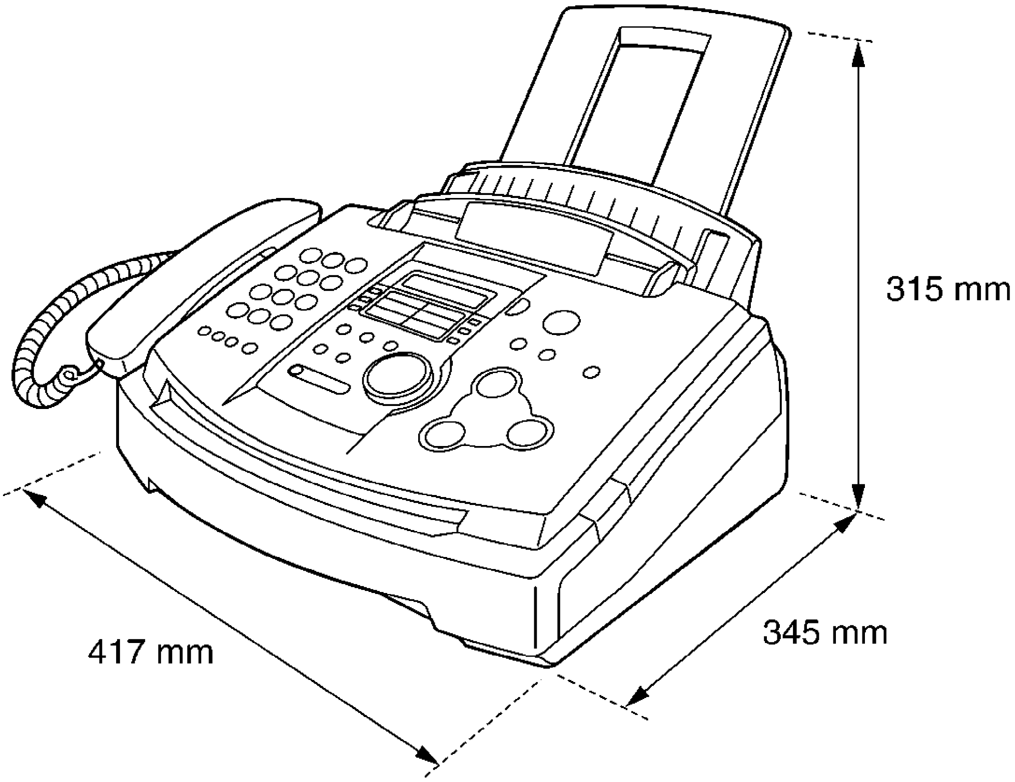
To use the fax machine with a computer on the same line.

- **We recommend you use separate wall jacks for the fax machine and the computer.**
- **Set the fax machine to TEL mode.**
- **The device which has the shortest ring setting will answer the call first.**
- **If the computer provides a port for a telphone line, connect the faxmachine to this port on the computer.**

1.14. INSTALLATION

1.14.1. INSTALLATION SPACE

The space required to install the unit is shown below.
The dimensions given are necessary for the unit to operate efficiently.

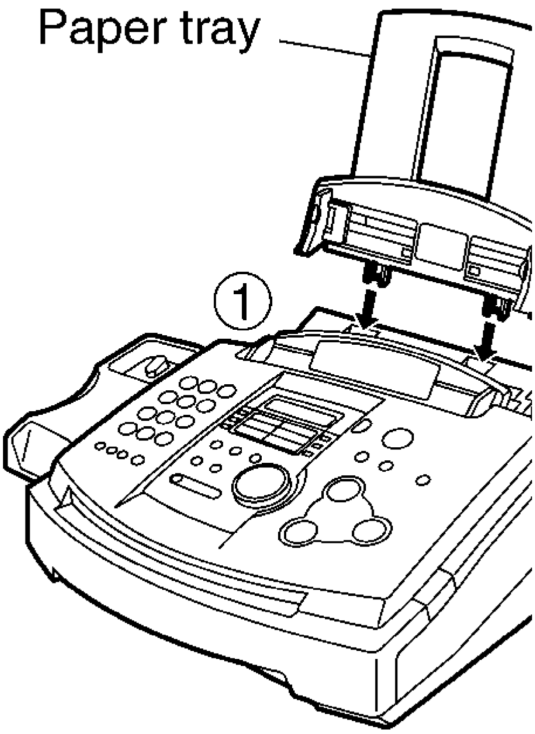


Note:

- **Avoid excessive heat or humidity.**
- **Use the unit within the following ranges of temperature and humidity.**
- **Ambient temperature: 5°C to 35°C**
- **Relative humidity: 20% to 80% (without condensation)**
- **Power cord length should be less than 5 meters (16.4 feet). Using a longer cord may reduce the voltage or cause malfunctions.**
- **Avoid direct sunlight.**
- **Do not install near devices which contain magnets or generate magnetic fields.**
- **Do not subject the unit to strong physical shock or vibration.**
- **Keep the unit clean. Dust accumulation can prevent the unit from functioning properly.**
- **To protect the unit from damage, hold both sides when you move it.**

1.14.2. INSTALLING THE PAPER TRAY

Install the paper tray into the two slots on the back of the unit (①). Let it lean back until it clicks into place (②).

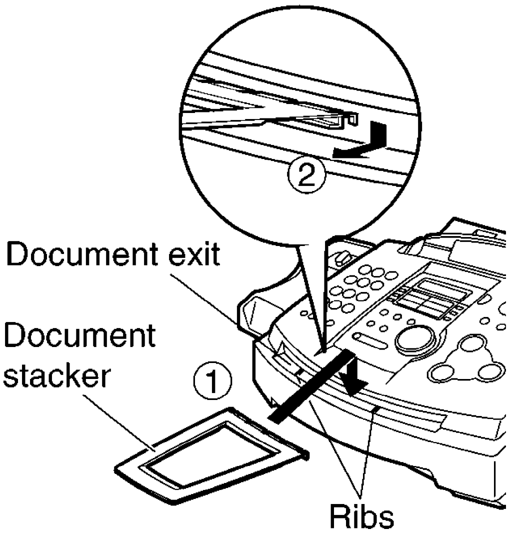

Paper tray
①

Note:

- Do not place the unit in areas where the paper tray may be obstructed by a wall, etc.

1.14.3. DOCUMENT STACKER

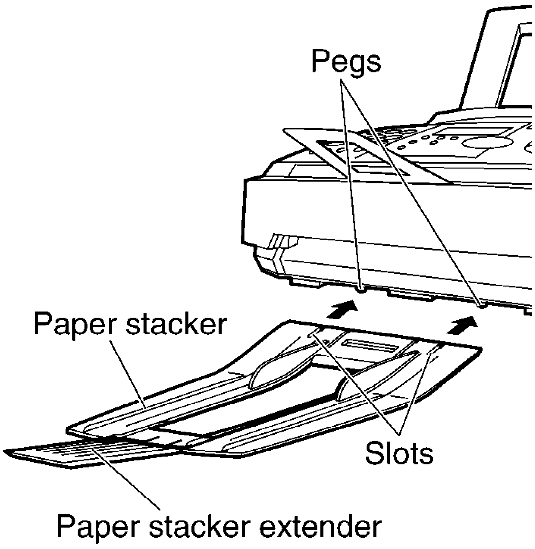
Align with the ribs on the document exit (①). Pull the document stacker forward gently until it clicks into place (②).


②
Document exit
Document stacker
①
Ribs

1.14.4. PAPER STACKER

Line up the slots in the paper stacker with the pegs on the bottom of the unit, then slide until locked. Open the paper stacker extender when you use legal size paper.

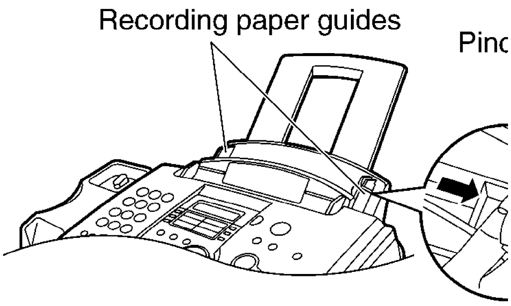
-The paper stacker can hold approx. 100 sheets of printed paper. Remove the printed paper before they are filled on the paper stacker.



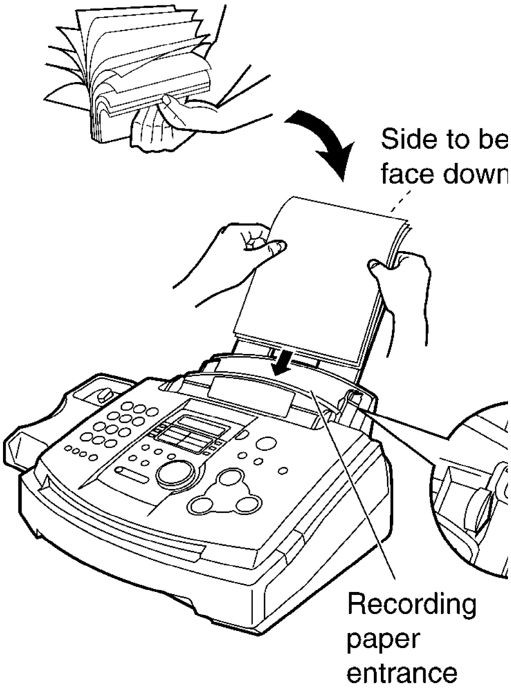
1.14.5. INSTALLING THE RECORDING PAPER

Letter*, legal or A4 size recording paper can be used for fax messages. The unit can hold up to 150 sheets of 60 g/m2 to 75 g/m2 (16 lb. to 20lb.) paper or 120 sheets of 90 g/m2 (24 lb.) paper.
Letter: 216 mm × 279mm (8 1/2” × 11”)
Legal: 216 mm × 356 mm (8 1/2” × 14”)
A4: 210 mm × 297 mm (8 1/4” × 11 11/16”)
COM10: 105 mm × 241 mm (4 1/8” × 9 1/2”)
DL: 110 mm × 220 mm (4 5/16” × 8 5/8”)
The unit is set for letter size paper by default. If you want to use legal or A4 size paper, change the setting (Code no. 16 on PROGRAM MODE TABLE()).

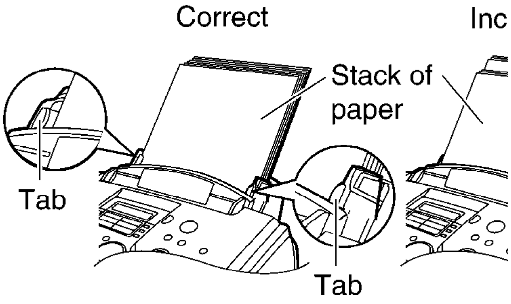
1. **Pinch the right side of the recording paper guide, then slide it open to its full width.**


Recording paper guides
Pinc

2. **Fan the stack of paper to prevent a paper jam.**


Side to be
face dow
Recording
paper
entrance

3. **Insert the paper into the recording paper entrance.**
   - The paper should not be over the tab.
   - If the paper is not inserted correctly, readjust the paper, or the paper may jam.


Correct
Inc
Stack of
paper
Tab
Tab

4. **Adjust the widh of the guides to the size of the recording paper by sliding the light recording paper guide.**

Note for recording paper:

- Avoid using paper with a cotton and/or fiber content that is over 20%, such as letterhead paper or paper used for resumes.

- Do not use different types or thicknesses of paper at the same

time. This may cause a paper jam.

- Avoid extremely smooth or shiny paper that is highly textured.

- Avoid paper that is coated, damaged or wrinkled.

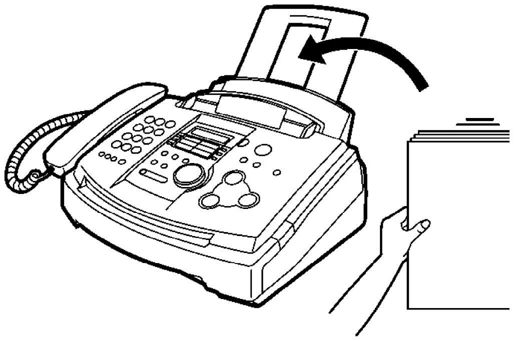
Note:

- Avoid double-sided printing

- Do not use paper printed from this unit for double-sided printing with other copiers or printers, or the paper may jam.

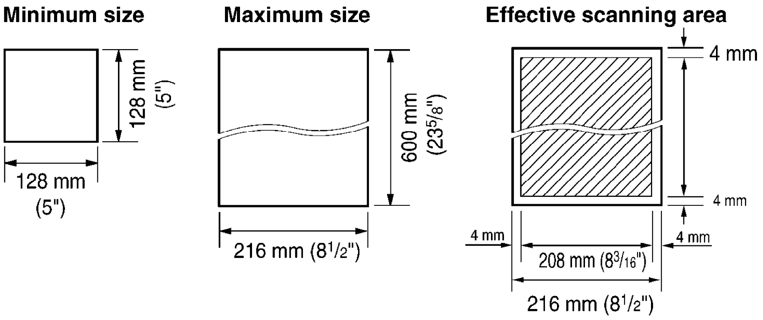
- Some paper only accepts print on one side. Try using the other side of paper if you are not happy with the print quality.

1.14.5.1. ADDING PAPER



1. **Remove all of the installed paper.**
2. **Add paper to the removed paper and straighten.**
3. **Fan the stack of paper.**
4. **Insert the paper into the recording paper entrance.**

1.14.6. DOCUMENTS THE UNIT CAN FEED


Minimum size
128 mm (5")
128 mm (5")
Maximum size
600 mm (23⁵/₈")
216 mm (8¹/₂")
Effective scanning area
4 mm
4 mm
4 mm
4 mm
208 mm (8³/₁₆")
216 mm (8¹/₂")

Document weight

Single sheet:
45 g/m^2 to 90 g/m^2
(12 lb. to 24 lb.)

Multiple sheets:
60 g/m^2 to 75 g/m^2
(16 lb. to 20 lb.)

Note:

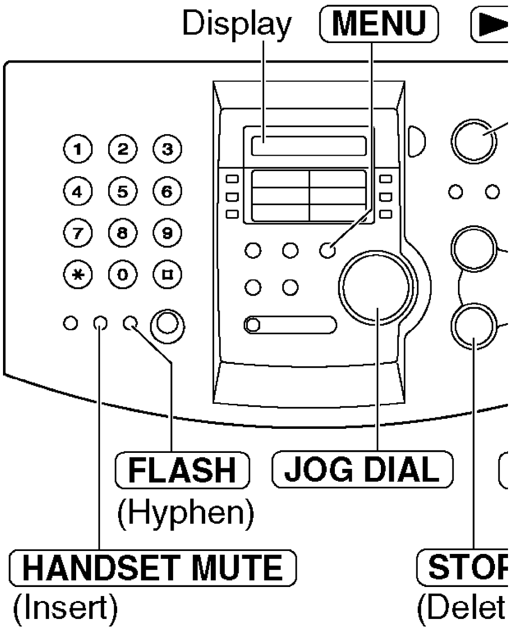
- Remove chips, staples or other similar fastening objects.

- Check that ink, paste or correction fluid has dried.

- **Do not send the following types of documents. Use copies for fax transmission.**
  - **— Chemically treated paper such as carbon or carbon less duplicating paper**
  - **— Electrostatically charged paper**
  - **— Heavily curled, creased or torn paper**
  - **— Paper with a coated surface**
  - **— Paper with a faint image**
  - **— Paper with printing on the opposite side that can be seen through the front (e.q. newspaper)**
- **To transmit the document(s) with a width of less than standardletter size (216 mm), we reccommend using a copy machine to copy the original document onto letter-sized paper, then transmit the copied document.**

1.14.7. SETTING YOUR LOGO

The logo can be your company, division or name.


Display
MENU
1
2
3
4
5
6
7
8
9
0
FLASH
(Hyphen)
JOG DIAL
HANDSET MUTE
(Insert)
STO
(Delet

1. **Press MENU.**
   Display:
2. **Press #, then 0 2.**
3. **Press SET.**

4. **Enter your logo, up to 30 characters, using the dial keypad.**
Example: Bill

1. Press 2 twice.

2. Press 4 six times.

3. Press 5 six times.

4. Press ▶ to move the cursor to the next space and press 5 six times.

To change capital or lower case letters
Pressing the "#" key will change to capit lower case alternatively.

1. Press 2 twice.
Display:

2. Press 4 three times.

3. Press #.

4. Press 5 three times.

5. **Press SET.**

6. **Press MENU.**

Note:

- You can enter your logo by rotating JOG DIAL.

To correct a mistake

-Press ▶ or ◀ to move the cursor to the incorrect character, then make the correction.

To delete a character

-Move the cursor to the character you want to delete and press STOP.

To insert a character

1. Press ▶ or ◀ to move the cursor to the position to where you want to insert the character.

2. Press HANDSET MUTE (Insert) to insert a enter the character.

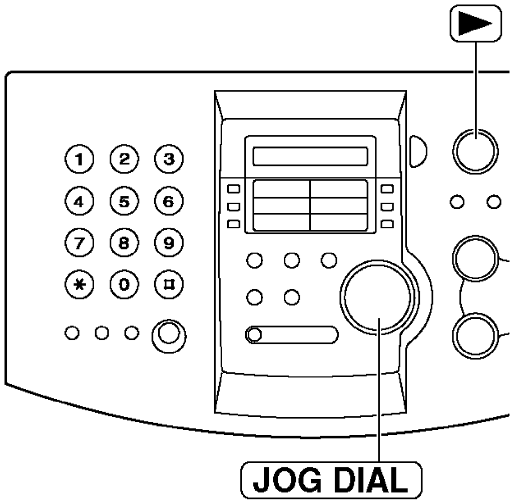
1.14.8. TO SELECT CHARACTERS WITH THE DIAL KEYPAD

Pressing the dial keys will select a character as shown below.

Keys	Characters
①	1 [ ] { } + - / = , . _ ` : ; ? |
②	A B C a b c 2
③	D E F d e f 3
④	G H I g h i 4
⑤	J K L j k l 5
⑥	M N O m n o 6
⑦	P Q R S p q r s 7
⑧	T U V t u v 8
⑨	W X Y Z w x y z 9
⓪	0 ( ) 〈 〉 ! " # $ % & ¥ ∗ @ ^ ' →
(#)	To change capital or lower case letter.
FLASH	**Hyphen** button (To insert a hyphen.)
HANDSET MUTE	**Insert** button (To insert one character or one space.)
STOP	**Delete** button (To delete a character.)
▶ +	▶ key (To move the cursor to the right.) To enter another character using the same number key, move the cursor to the next space.
− ◀	◀ key (To move the cursor to the left.)

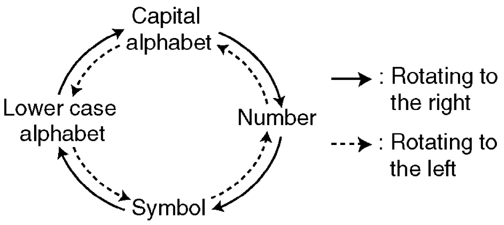
1.14.9. TO SELECT CHARACTERS USING THE JOG DIAL

Instead of pressing the dial keys, you can select characters using the JOG DIAL.



1. **Rotate JOG DIAL unit the desired character is displayed.**
2. **Press ▶ to move the cursor to the next space.**
   - The character displayed in step 1 is inserted.
3. **Return to step 1 to enter the next character.**

Display order of characters


Capital alphabet
Number
Symbol
Lower case alphabet
→ : Rotating to the right
- - -▶ : Rotating to the left

1.14.10. REPLACING THE TONER CARTRIDGE AND THE DRUM UNIT

When the display shows the following message, replace the toner cartridge.

Display: TONER LOW or TONER EMPTY

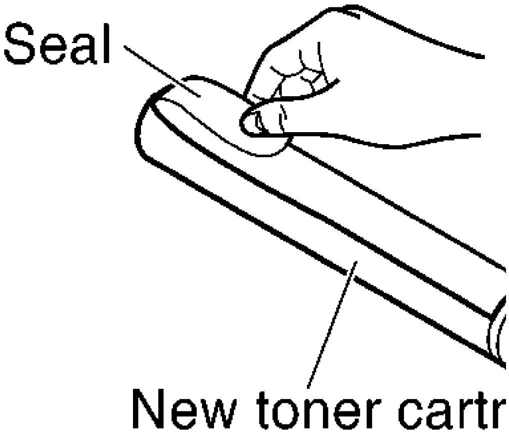
We recommend you replace the drum unit every third time you replace the toner cartridge. To check the drum life and quality, please print the test pattern. (Refer to TEST FUNCTIONS ().)

KX-FA76: Toner cartridge
KX-FA77D: Drum unit

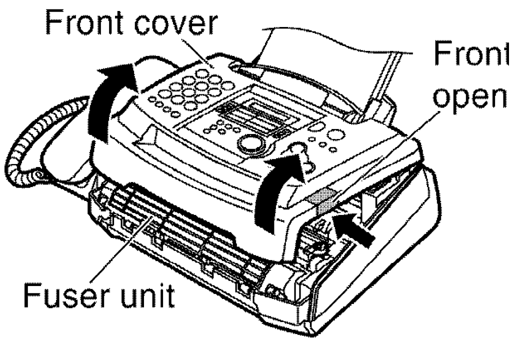
Caution:

- **The drum unit contains a photosensitive drum. Exposing it to light may damage the drum. Once you have opened the protection bag:**
  - **—Do not expose the drum unit to light for more than 5 minutes.**
  - **—Do not touch or scratch the green drum surface.**
  - **—Do not place the drum unit near dust or dirt, or in a high humidity area.**
  - **—Do not expose the drum unit to direct sunlight.**
- **Do not unplug the fax machine to prevent loss of fax documents in memory.**
- **Do not pour any toner into the toner cartridge.**

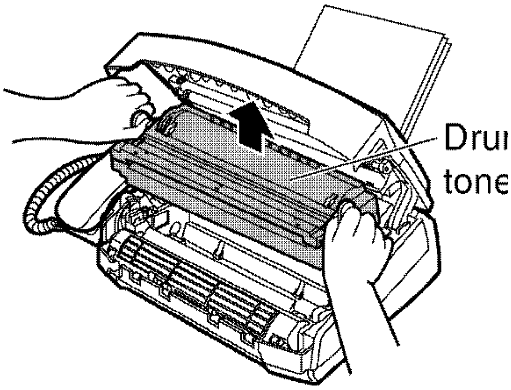
1. **Remove the new toner cartridge from the protection bag. Peel off the seal from the toner cartridge.**



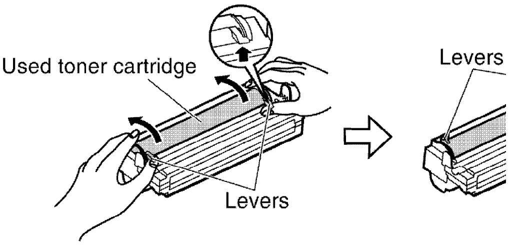
2. **Push the front cover open button then open the front cover.**


Front cover
Front
open
Fuser unit

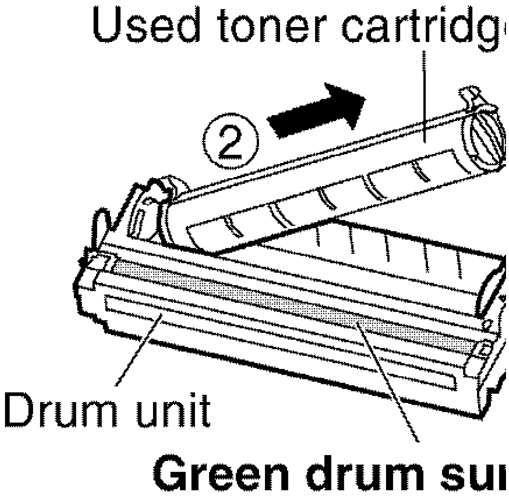
3. **Tap on the used toner cartridge several times to allow the remaining toner to fall into the drum unit. Remove the drum and toner unit by holding the two tabs.**



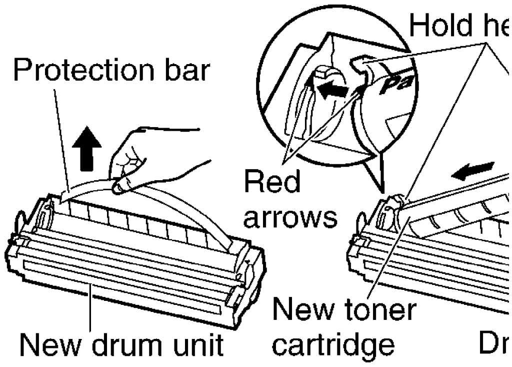
4. **Turn the two levers on the used toner cartridge firmly.**


Used toner cartridge
Levers
Levers

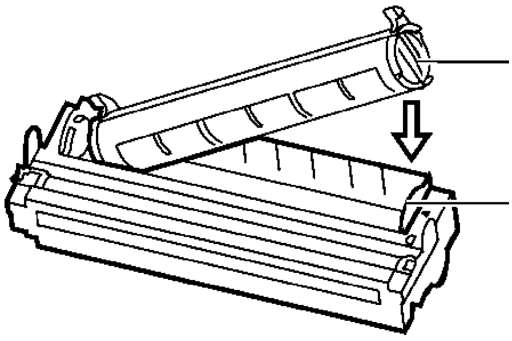
5. **Pull up the right edge of the used toner cartridge (①). Remove the cartridge from the drum unit (②).**
   - **The toner may stick to the cartridge and the drum unit. Be careful in handling.**
   - **Do not drop the toner on the green drum surface.**
   - **Put the used toner cartridge into the protection bag.**


Used toner cartridg
②
Drum unit
Green drum su

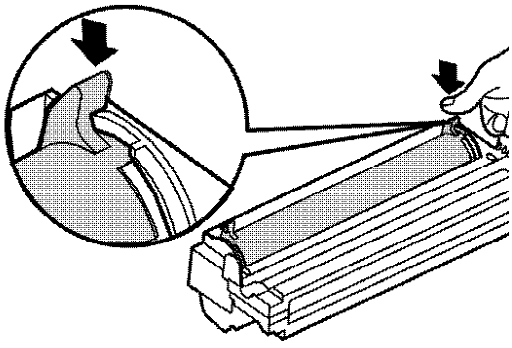
6. **If you replace the drum unit at the same time, remove the new drum unit from the protection bag. Remove the protection bar from the drum unit. / / With Panasonic face up on the toner cartridge, match the red arrows on the cartridge and the drum unit.**


Hold he
Protection bar
Pa
Red arrows
New toner cartridge
New drum unit
Dr

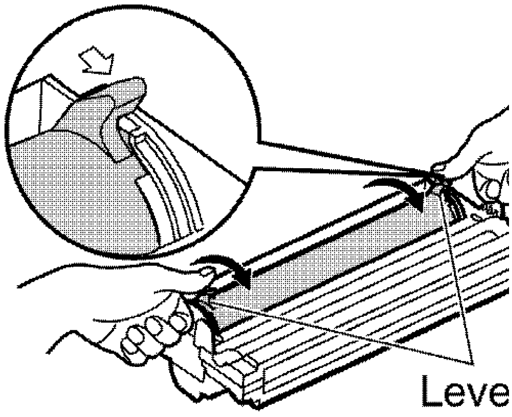
7. **Slide the tab on the toner cartridge into the slot of the drum unit.**



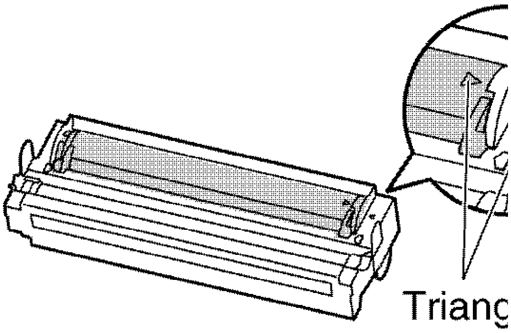
8a. **Firmly press down on the right side of the toner cartridge to snap into position and...**



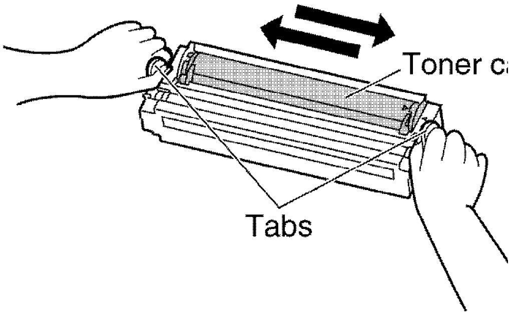
8b. **Turn the two levers on the toner cartridge with firm pressure.**



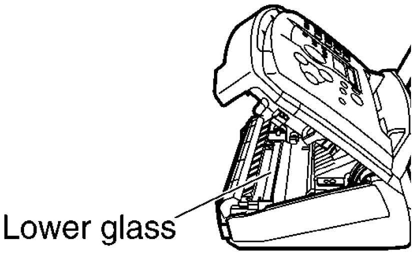
9. **The toner cartridge is installed when the triangles match.**



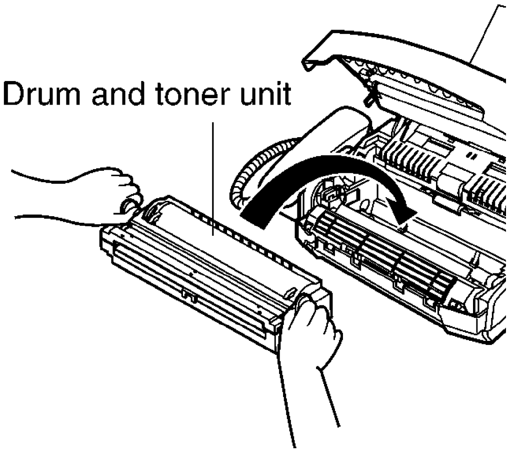
10. **Tap on the toner cartridge several times to allow the toner to fall into the drum unit. Grab the tabs, and shake the drum and toner unit horizontally several times.**


Toner c
Tabs

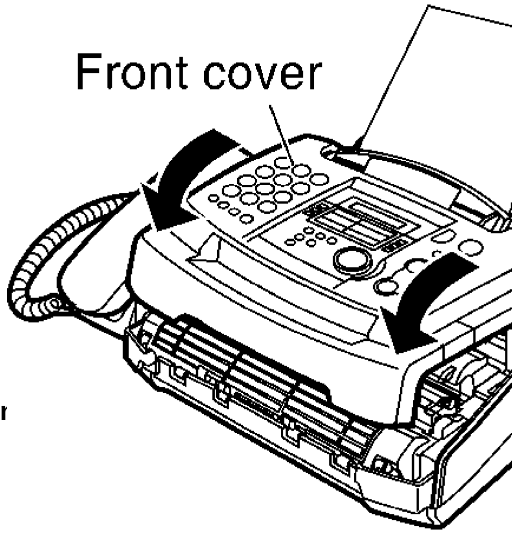
11. **Install the drum and toner unit by holding the tabs.**


Lower glass

- **If the lower glass is dirty, clean it with a soft and dry cloth.**


Drum and toner unit

12. Close the front cover, until locked by pushing down on both sides.



Waste disposal method

- Waste material may be dumped or incinerated under conditions which meet all federal, state an local environmental regulations.

1.15. MAINTENANCE ITEMS AND COMPONENT LOCATIONS

1.15.1. OUTLINE

MAINTENANCE AND REPAIRS ARE PERFORMED USING THE FOLLOWING STEPS.

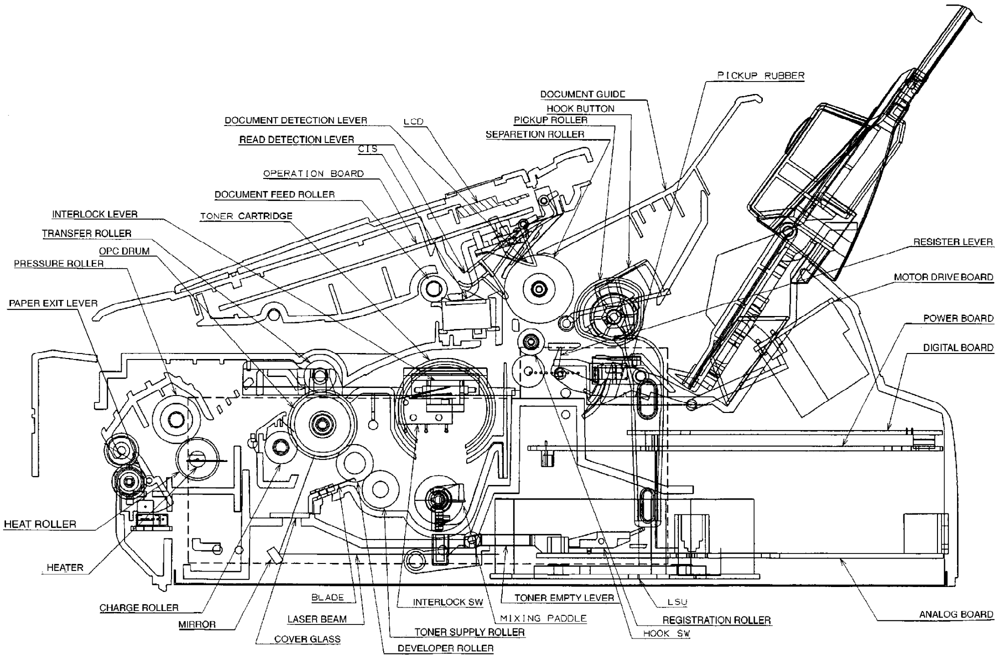
1. Periodic maintenance
   Inspect the equipment periodically and if necessary, clean any contaminated parts.
2. Check for breakdowns
   Look for problems and consider how they arose.
   If the equipment can be still used, perform copying, self testing or communication testing.
3. Check equipment
   Perform copying, self testing and communication testing to determine if the problem originates from the transmitter, receiver or the telephone line.
4. Determine causes
   Determine the causes of the equipment problem by troubleshooting.
5. Equipment repairs
   Repair or replace the defective parts and take appropriate measures at this stage to ensure that the problem will not recur.
6. Confirm normal operation of the equipment
   After completing the repairs, conduct copying, self testing and communication testing to confirm that the equipment operates

normally.

7. Record keeping

Make a record of the measures taken to rectify the problem for future reference.

1.15.2. MAINTENANCE CHECK ITEMS/COMPONENT LOCATIONS


PICKUP RUBBER
DOCUMENT GUIDE
HOOK BUTTON
PICKUP ROLLER
SEPARETION ROLLER
DOCUMENT DETECTION LEVER
LCD
READ DETECTION LEVER
CIS
OPERATION BOARD
DOCUMENT FEED ROLLER
TONER CARTRIDGE
INTERLOCK LEVER
TRANSFER ROLLER
OPC DRUM
PRESSURE ROLLER
PAPER EXIT LEVER
RESISTER LEVER
MOTOR DRIVE BOARD
POWER BOARD
DIGITAL BOARD
HEAT ROLLER
HEATER
CHARGE ROLLER
MIRROR
BLADE
LASER BEAM
COVER GLASS
INTERLOCK SW
TONER EMPTY LEVER
MIXING PADDLE
TONER SUPPLY ROLLER
DEVELOPER ROLLER
LSU
REGISTRATION ROLLER
HOOK SW
ANALOG BOARD

1.15.2.1. MAINTENANCE LIST

NO.	OPERATION	CHECK	REMARKS
1	Document Path	Remove any foreign matter such as paper.	—
2	Rollers	If the roller is dirty, clean it with a damp cloth then dry thoroughly.	Refer to MAINTENAN
3	Sensors	Document sensor (PS102), Paper feed sensor (PS103), Hook switch (SW200), Top cover open switch (SW101) Resist sensor (PC201) and Paper exit sensor (PS50). Paper sensor (PS1)Confirm the operation of the sensors.	See MAINTENANCE C ITEMS/COMPONENT LOCATIONS() and HO REMOVE THE TRANS ROLLER AND IMAGE ().
4	Glass	If the glass is dirty, clean them with a dry soft cloth.	Refer to MAINTENAN
5	Abnormal, wear and tear or loose parts	Replace the part. Check if the screws are tight on all parts.	—

1.15.2.2. MAINTENANCE CYCLE

No.	Item	Cleaning Cycle	Replacement	
			Cycle	Proced
1	Separation Roller	3 months	7 years* (100,000 documents)	Refer to HOW REMOVE THE COVER SECTI
2	Separation Rubber (Ref. No. 11)	3 months	7 years (100,000 documents)	Refer to HOW REMOVE THE TRANSFER RO AND IMAGE SE
3	Document Feed Roller (Ref. No. 7)	3 months	7 years (100,000 documents)	Refer to HOW REMOVE THE TRANSFER RO AND IMAGE SE
4	Separation paper rubber (Ref. No. 162)	3 months	7 years (100,000 documents)	Refer to HOW REMOVE THE COVER SECTI
5	Exit Roller(Ref.No.197)	3 months	7 years (100,000 documents)	Refer to HOW REMOVE THE ROLLER AND ROLLER().

1.15.3. MAINTENANCE

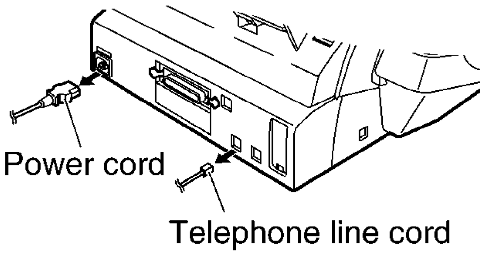
1.15.3.1. CLEANING THE INSIDE OF THE UNIT

If any of the following problems occurs, clean the inside of the unit:
—If misfeeding of your original occurs frequently.
—If a black line, a white line or a dirty pattern appears on your recording paper, on your original, or on the fax document received by the other party.

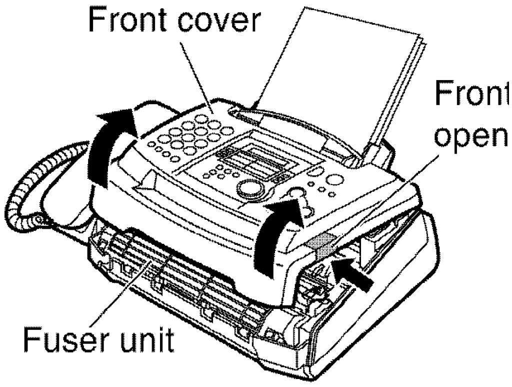
Caution:

- **Be careful when handling the toner drum unit.**
- **Do not use paper products, such as paper towels or tissues, to clean the inside of the unit.**

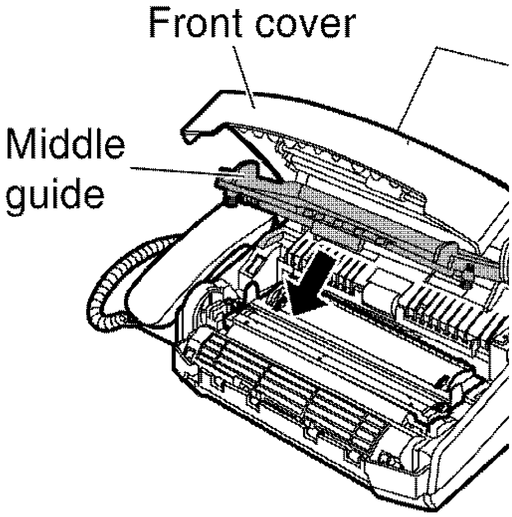
1. **Disconnect the power cord and the telephone line cord.**


Power cord
Telephone line cord

2. **Push the front cover open button then open the front cover.**

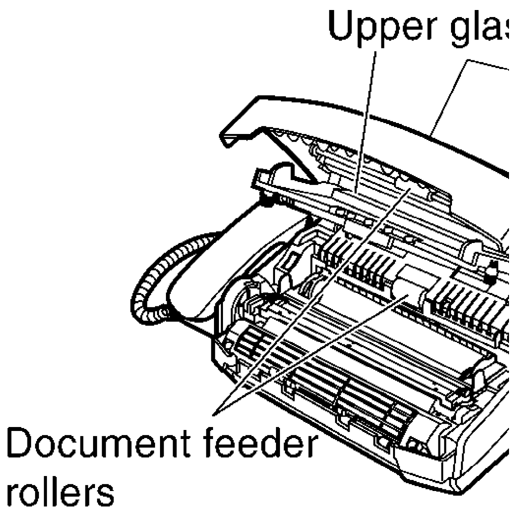

Front cover
Front
open
Fuser unit

3. **Pull down the middle guide while holding the front cover.**

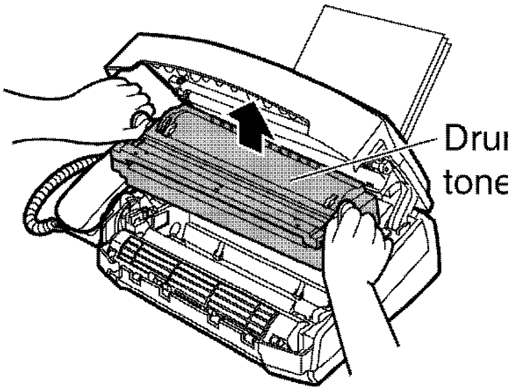

Front cover
Middle
guide

4. **Clean the document feeder rollers with a cloth moistened with isopropyl rubbing alcohol, and let all parts dry thoroughly. / / Clean the upper glass with a soft and dry cloth.**

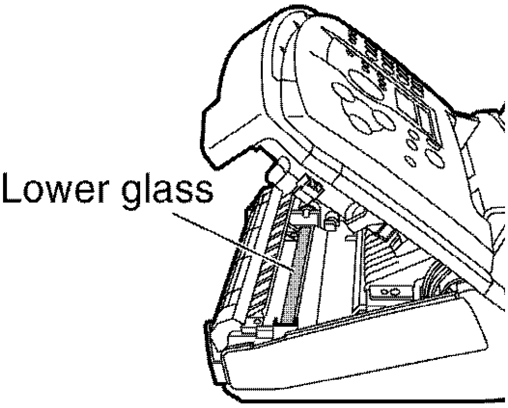
5. **Lift the middle guide firmly.**


Upper gla
Document feeder
rollers

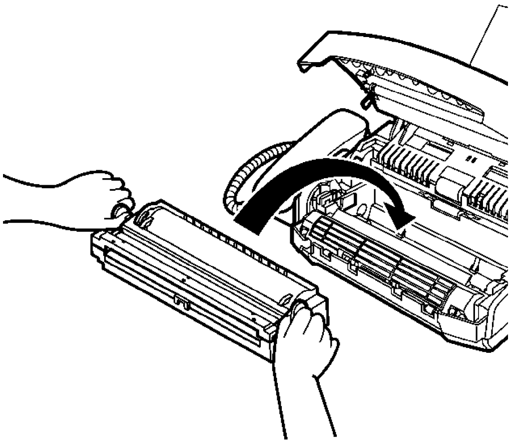
6. Remove the drum and toner unit by holding the two tabs.



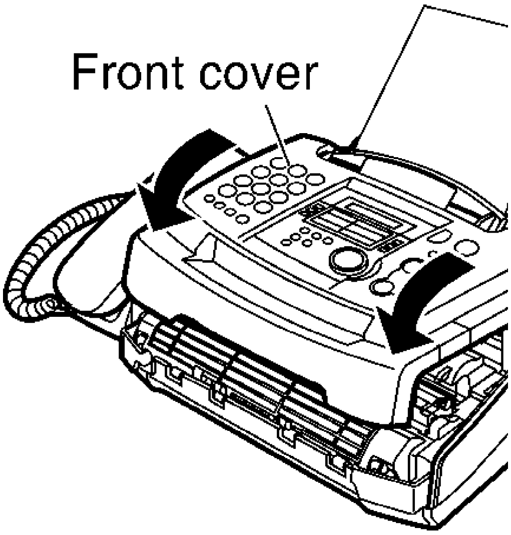
7. Clean the lower glass with a soft and dry cloth.


Lower glass

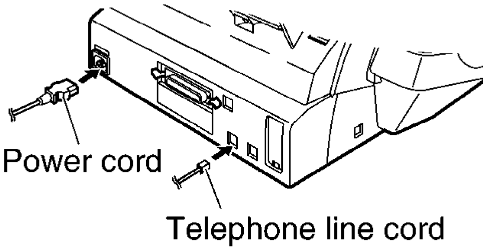
8. Reinstall the drum and toner unit by holding the tabs.



9. **Close the front cover, until locked, securely by pushing down on both sides.**



10. **Reconnect the power cord and the telephone line cord.**



2. TROUBLESHOOTING GUIDE

2.1. TROUBLESHOOTING SUMMARY

2.1.1. TROUBLESHOOTING

After confirming the problem by asking the user, troubleshoot according to the instructions and observe the following precautions.

2.1.2. PRECAUTIONS

1. **If there is a problem with the print quality or the paper feed, first check if the installation space and the print paper meets the specifications, the paper selection lever/paper thickness lever is set correctly, and the paper is set correctly without any slack.**
2. **Before troubleshooting, first check that the connectors and cables are connected correctly (not loose).
If the problem occurs randomly, check it very carefully.**
3. **When connecting the AC power cord with the unit and checking the operation, exercise utmost care when handling electric parts in order to avoid electric shocks and short-circuits.**
4. **After troubleshooting, double check that you have not forgotten**

any connectors, left any loose screws, etc.

5. Always test to verify that the unit is working normally.

2.1.3. WHEN YOU DON'T KNOW HOW TO OPERATE THE UNIT, USE THE HELP FUNCTION

- How to use:

1. press HELP.
2. press JOG DIAL until the desired item is displayed.
3. press SET.

2.2. USER RECOVERABLE ERRORS

If the unit detects a problem, one or more of the following messages will appear on the display.
The explanations given in the [ ] are for servicemen only.

DISPLAY MESSAGE	CAUSE AND REMEDY
CALL SERVICE 1	-Polygon motor error. Refer to CALL SERVICE TROUBLESHOOTING GUIDE ().
CALL SERVICE 2	-Laser beam error. Replace LSU unit. Refer to CALL SERVICE TROUBLESHOOTING GUIDE ().
CALL SERVICE 3	-Fusser unit cannot heat up. Replace fusser unit. Refer to CALL SERVICE TROUBLESHOOTING GUIDE ().
CALL SERVICE 4	-Fan motor error. Replace fan motor. Refer to CALL SERVICE TROUBLESHOOTING GUIDE ().
CHANGE DRUM	-There is something wrong with the drum unit. Replace the drum unit and the toner cartridge.
CHECK DOCUMENT	-The document is not fed into the unit properly. Reinsert the document. If misfeeding occurs frequentl document feeder rollers and try again. If the problem remains, adjust the feeder pressure. (Refer to AD () and DOCUMENT JAMS ().)
CHECK DRUM	-The drum unit is not inserted properly. Reinsert it correctly. -The installed drum is worn out. Replace the drum unit with a new one.
CHECK MEMORY	-Memory (telephone numbers, parameters, etc.) has been erased. Re-program. [The backup lithium battery on the top of the digital board may be low or dead, so check it.]
COVER OPEN	-The front cover is open. Close it.
DATA IN MEMORY	-You tride to change the cable type setting (feature #15), while the fax machine has a document in me sending faxes, print out the document in memory or cancel the delayed transmission (feature #25) anc
FAILED PICK UP	-Recording paper was not fed into the unit properly. Reinsert the recording paper.
FAX IN MEMORY	-The unit has a document in memory. See the other displayed message instructions to print out the dc
FAX MEMORY FULL	-Memory is full of received documents due to lack of recording paper or a recording paper jam, etc. In or clear the jammed paper. -When performing memory transmission, the document being stored exceeds the memory capacity of Transmit the entire document manually.
JOG-DIAL FULL	-There is no space to store new stations in the JOG DIAL directory. Erase unnecessary entries.
LINE IN USE	-You cannot change the cable the type setting (feature #15) while using the handset or the monitor. Ha try again.

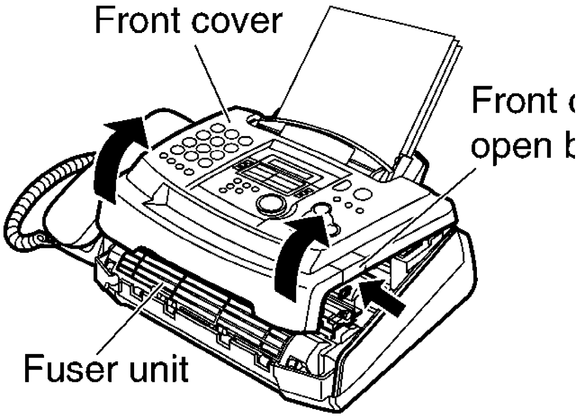
DISPLAY MESSAGE	CAUSE AND REMEDY
MEMORY FULL	-When making a copy, the document being stored exceeds the memory capacity of the unit. Press [S clear the message. Divide the document into sections.
MODEM ERROR	-There is something wrong with the modem circuit.
NO FAX REPLY	-The other party´s fax machine is busy or has run out of recording paper. Try again.
OUT OF PAPER	-Recording paper is not installed or the unit has run out of paper. Install paper. -Recording paper is not fed into the unit properly. Reinstall paper.
PAPER JAMMED	-A recording paper jam occurred. Clean the jammed paper. [If the printout jams, please refer to RECORDING PAPER JAMS ().]
PC FAIL OR BUSY	-The cable or the PC power cord is not connected correctly. Check the connections. -The software is not running on the PC. Restart the software and try again.
PLEASE WAIT	-The unit is warming up. Wait for a while.
REDIAL TIME OUT	-The other party´s fax machine is busy or has run out of recording paper. Try again.
REMOVE DOCUMENT	-The document is jammed. Remove the jammed document. -Attempted to transmit a document longer than 600 mm (23 5/8”). Press the [STOP] to remove the do Divide the document into two or more sheets and try again. -[Alternately, turn off service code #559 to enable sending of documents longer than 600 mm] (Refer t DOCUMENT JAMS ().)
TONER EMPTY	-The toner cartridge is empty. Replace the toner cartridge.
TONER LOW	-The remaining toner is low. Replace the toner cartridge and as soon as possible. We recommend you drum unit every third time you replace the toner cartridge. To check the drum life and quality, please p printer test list. (Refer to TEST FUNCTIONS ().)
TRANSMIT ERROR	-A transmission error occurred. Try again.
WRONG PAPER	-The fax mssage was printed on paper which is shorter than letter size paper. Use the appropriate size paper.

2.2.1. DOCUMENT JAMS

If the unit does not release the document during feeding, remove the jammed document as follows.

1. **Push the front cover open button then open the front cover.**

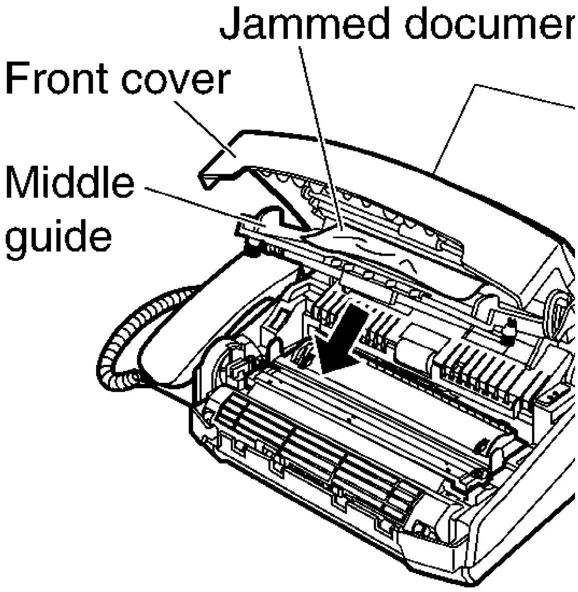
Caution:
The fuser unit gets hot. Do not touch it.


Front cover
Front
open
Fuser unit

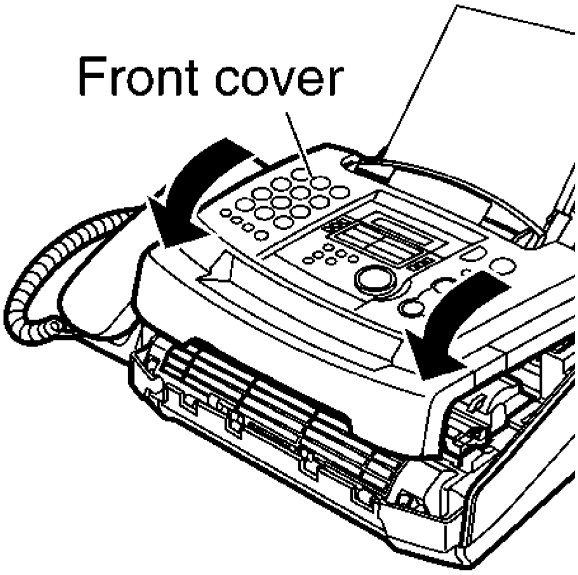
2. **Pull down the middle guide while holding the front cover.**

3. **Remove the jammed document carefully.**

4. **Life the middle guide firmly.**

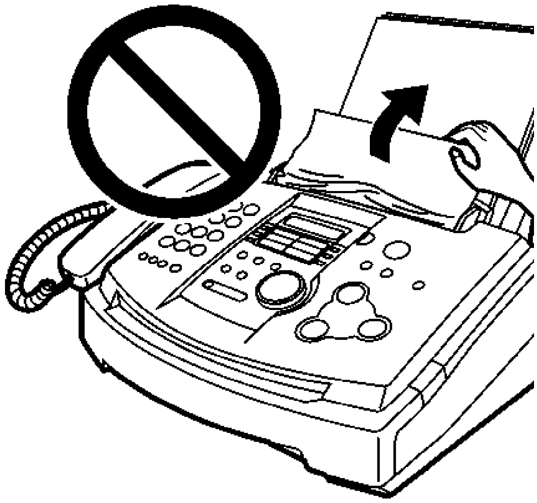

Jammed documen
Front cover
Middle guide

5. **Close the front cover, until locked, by pushing down on both ends.**


Front cover

Note:

- Do not pull out the jammed document forcibly before opening the front cover.



2.2.2. RECORDING PAPER JAMS

If the unit does not eject any recording paper during reception or copying, the recording paper has jammed and the display will show the following massage.

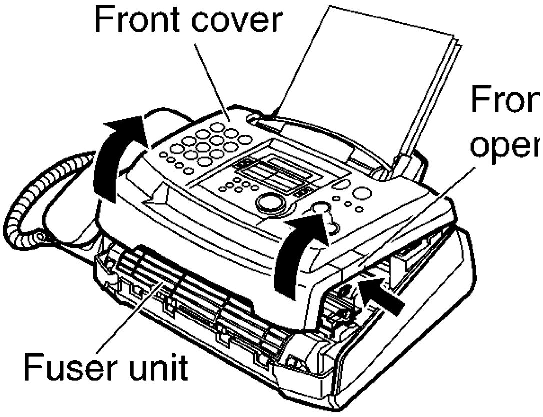
Display:

`PAPER JAMMED`

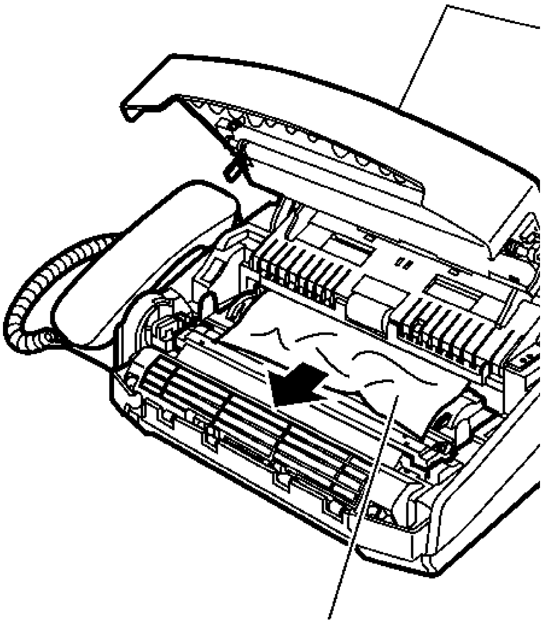
Remove the jammed paper as follows.

1. **Push the front cover open button then open the front cover.**

Caution:
The fuser unit gets hot. Do not touch it.

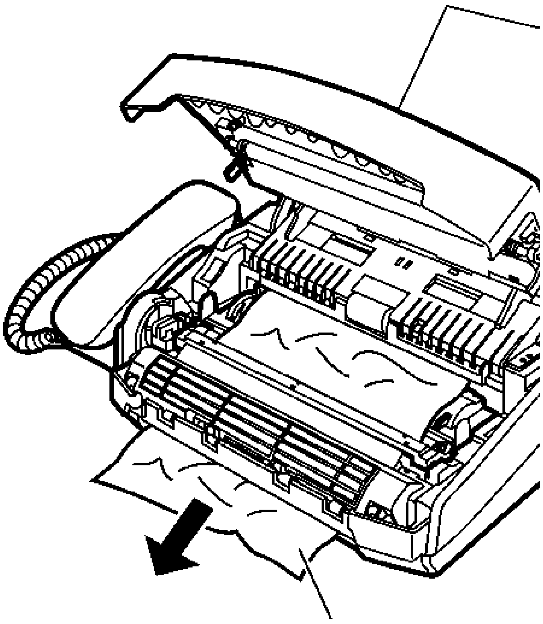


2. **When the recording paper has jammed near the drum and toner unit: / Remove the jammed paper by pulling it toward you.**



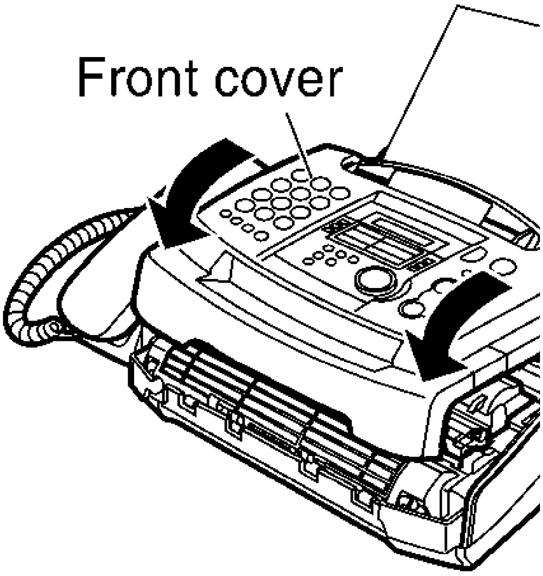
Jammed paper

When the recording paper has jammed near the recording paper exit: / Remove the jammed paper by pulling it toward you.

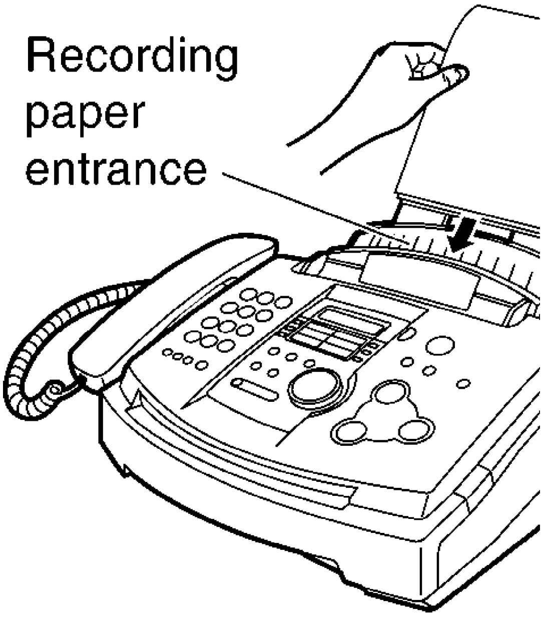


Jammed paper

3. **Close the front cover,until locked, by pushing down on both ends.**



4. **Remove the recording paper. Straighten and reinsert it into the recording paper entrance.**



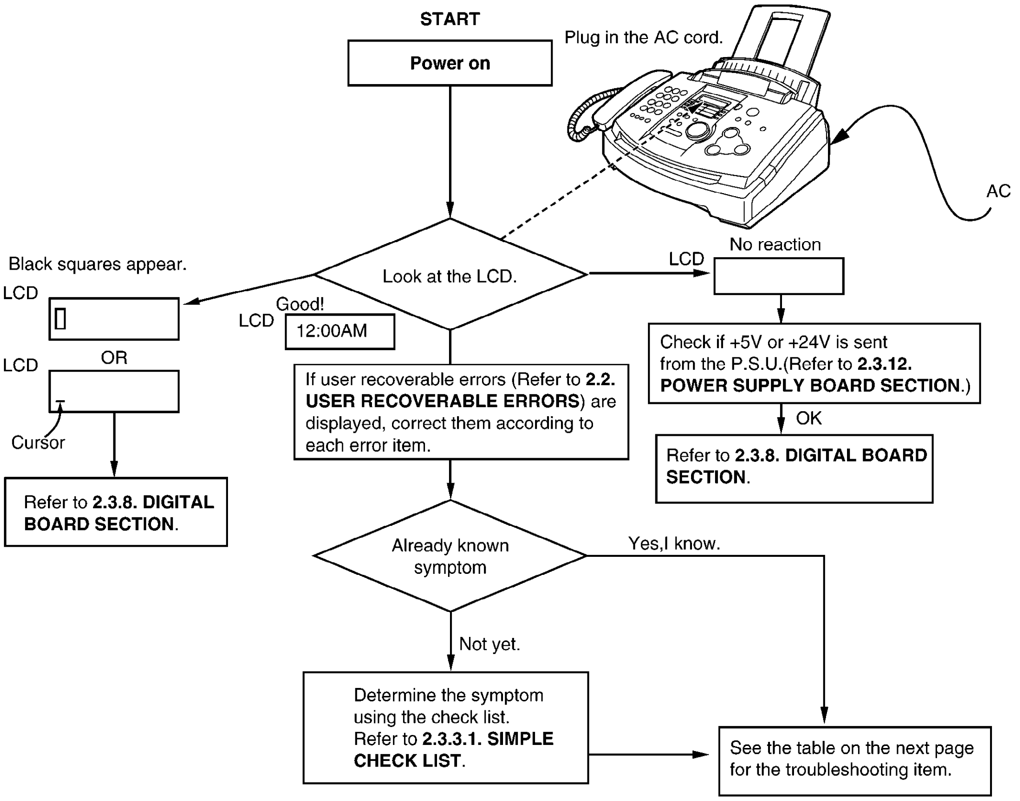
2.3. TROUBLESHOOTING DETAILS

2.3.1. OUTLINE

Troubleshooting is for recovering quality and reliability by determining the broken component and replacing, adjusting or cleaning it as required. First, determine the problem then decide the troubleshooting method. If you have difficulty finding the broken part, determine which board is broken. (For example: the Digital PCB, Analog PCB, etc.) The claim tag from a customer or dealer may use different expressions for the same problem, as they are not a technician or engineer. Using your experience, test the problem area corresponding to the claim. Also, returns from a customer or dealer often have a claim tag. For these cases as well, you need to determine the problem. Test the unit using the simple check list on SIMPLE CHECK LIST(). Difficult problems may be hard to determine, so repeated testing is necessary.

2.3.2. STARTING TROUBLESHOOTING

Determine the symptom and the troubleshooting method.


START
Power on
Plug in the AC cord.
AC
Look at the LCD.
Black squares appear.
LCD
LCD
OR
Cursor
Refer to 2.3.8. DIGITAL BOARD SECTION.
Good!
LCD
12:00AM
No reaction
LCD
Check if +5V or +24V is sent from the P.S.U.(Refer to 2.3.12. POWER SUPPLY BOARD SECTION.)
OK
Refer to 2.3.8. DIGITAL BOARD SECTION.
If user recoverable errors (Refer to 2.2. USER RECOVERABLE ERRORS) are displayed, correct them according to each error item.
Already known symptom
Yes,I know.
Not yet.
Determine the symptom using the check list. Refer to 2.3.3.1. SIMPLE CHECK LIST.
See the table on the next page for the troubleshooting item.

CROSS REFERENCE:

USER RECOVERABLE ERRORS()

SIMPLE CHECK LIST()

DIGITAL BOARD SECTION()

POWER SUPPLY BOARD SECTION()

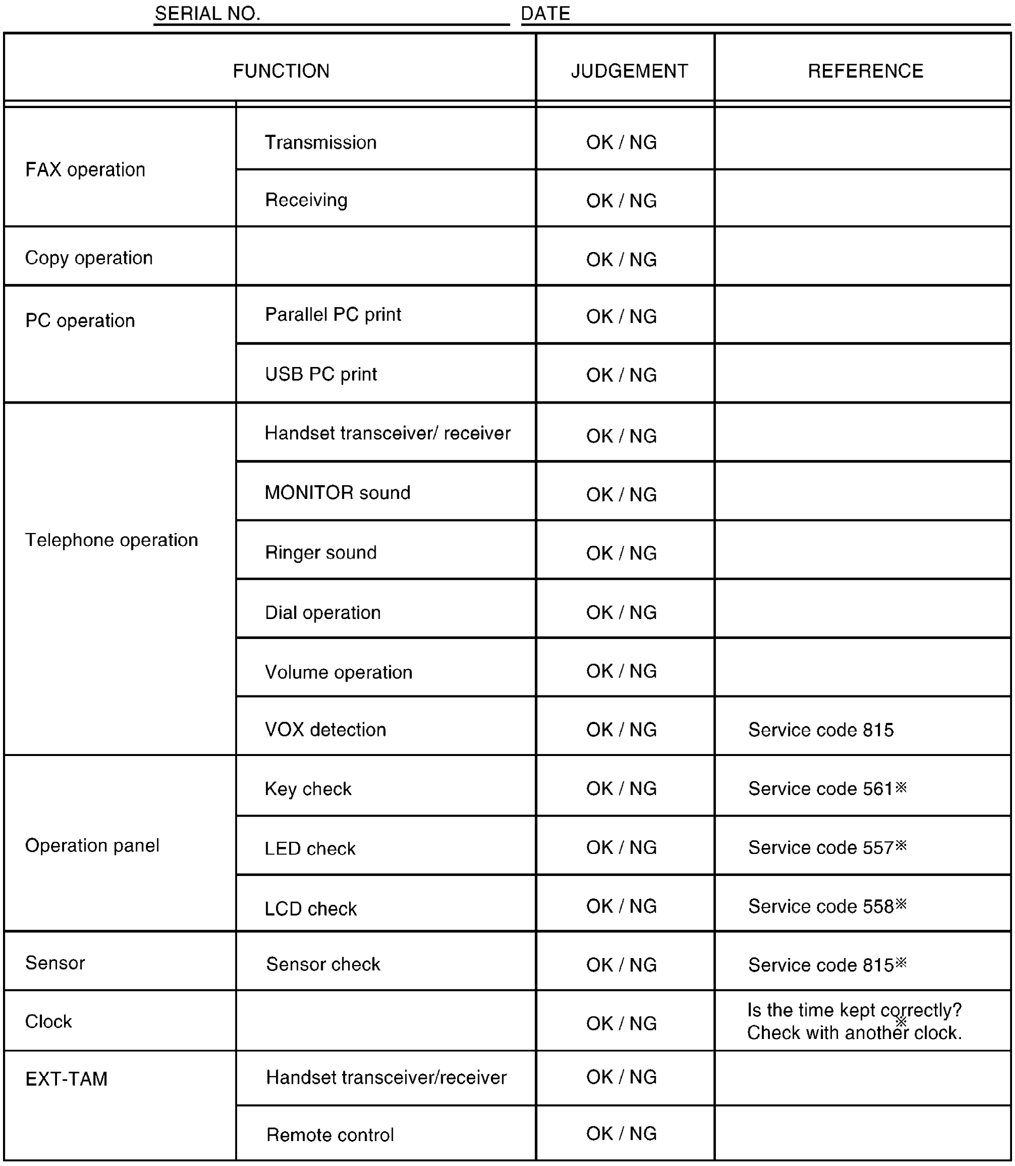
2.3.3. TROUBLESHOOTING ITEMS TABLE

ITEM	SYMPTOM	REFERENCE
ADF (Auto Document Feeder)	The document does not feed. Document jam Multiple feed Skew	See **2.3.6. ADF (Auto document feed) SECTION**.
Recording paper feed	The recording paper does not feed. Paper jam Multiple feed and skew	See **2.3.6. ADF (Auto document feed) SECTION**.
Printing	The sent fax data is skewed. The received fax data is skewed. The received or copied data is expanded. A blank page is copied. A blank page is received. Black or white vertical line Black or white lateral line An abnormal image is printed.	See **2.3.6. ADF (Auto document feed) SECTION**.
Communication FAX, TEL (analog board)	Cannot communicate by fax. An error code is displayed.	See **2.3.7. COMMUNICATION SECTION**.
	Cannot talk. The DTMF tone doesn't work. The handset/monitor doesn't work, etc.	See **2.3.9. ANALOG BOARD SECTION**.
Operation panel	Keys are not accepted.	See **2.3.9.4 OPERATION PANEL SECTION**.
Sensor	If the electric circuit is the cause, the error message corresponding to the sensor will be displayed.	See **2.3.9.5 SENSOR SECTION**.

CROSS REFERENCE:

ADF(Auto document feed) SECTION()
COMMUNICATION SECTION()
ANALOG BOARD SECTION()
OPERATION PANEL SECTION()
SENSOR SECTION()

2.3.3.1. SIMPLE CHECK LIST



SERIAL NO. ____________ DATE ____________

FUNCTION		JUDGEMENT	REFERENCE
FAX operation	Transmission	OK / NG	
	Receiving	OK / NG	
Copy operation		OK / NG	
PC operation	Parallel PC print	OK / NG	
	USB PC print	OK / NG	
Telephone operation	Handset transceiver/ receiver	OK / NG	
	MONITOR sound	OK / NG	
	Ringer sound	OK / NG	
	Dial operation	OK / NG	
	Volume operation	OK / NG	
	VOX detection	OK / NG	Service code 815
Operation panel	Key check	OK / NG	Service code 561※
	LED check	OK / NG	Service code 557※
	LCD check	OK / NG	Service code 558※
Sensor	Sensor check	OK / NG	Service code 815※
Clock		OK / NG	Is the time kept correctly? Check with another clock.
EXT-TAM	Handset transceiver/receiver	OK / NG	
	Remote control	OK / NG	

Note:
Check according to the service code referring to TEST FUNCTIONS ()

2.3.3.2. SIMPLIFIED TROUBLESHOOTING GUIDE

No.	Symptom	Cause	Countermeasur
1	Printing all white	No printing data	Check the digital board
2	Printing all black with white frame	Video signal always "L"	Check the digital board
3	Printing all black without white frame	No charge	Check the terminal of the voltage PCB or exchange drum unit
	(Dirty on the back side and Easy to jam)	Laser beam always ON	Check the digital board
4	Printing vertical white line	Dust on the pass of the laser beam	Clean the pass of laser b
		Dust on the developer roller	Exchange the drum unit
		Dust on the shading plate	Clean the shading plate
5	Printing vertical black line	Dust on the developer roller	Exchange the drum unit
		Dirty the glass of CIS	Clean the glass of CIS
6	Printing horizontal white line	Failed drum unit	Exchange the drum unit
7	Printing horizontal black line	Scratch on the OPC drum	Exchange the drum unit
		Static electricity on the documents when copying	Check the connection be parts around CIS and ear
8	Printing white dots (27mm pitch)	Hard toner on the developer roller	Exchange the drum unit
	(75mm pitch)	Dirty OPC drum	Exchange the drum unit
	(only photo copy mode)	Dirty blush	Exchange the drum unit
9	Printing black dots (75mm pitch)	Scratch on the OPC drum	Exchange the drum unit
	(75mm pitch)	Dirty OPC drum	Exchange the drum unit
	(27mm pitch)	Scratch of the developer roller	Exchange the drum unit
10	Printing dirty on the both sides	Spilled toner from the gap of the developer roller	Exchange the drum unit
11	Printing dirty on the top and the rear	Dirty paper pass	Clean the recording pape
12	Printing dirty on the all area	Smug of toner	Exchange the drum unit
13	Printing dirty on the back sides	Dirty paper pass	Clean the recording pape
		Dirty press roller	Clean the press roller
14	Printing ghost	Failed transfer roller	Exchange the transfer ro
		Failed drum unit	Exchange the drum unit
		Too thick recording paper	Use the recording paper to 24lb
15	Printing black part with unevenness	Short toner	Supply toner
		Dust on the pass of the laser beam	Clean the pass of laser b
		Life of the drum unit is over	Exchange the drum unit
16	Printing unevenly	Short toner	Exchange the drum unit
		Dust on the pass of the laser beam	Clean the pass of laser b
17	Recording paper jam	Bad performance of the heat roller	Clean or exchange the he

No.	Symptom	Cause	Countermeasur
		The Paper exit sensor cannot detect the recording paper	Exchange the Paper exit check the PCB
		Too thin recording paper	Use the recording paper to 24lb
		No connection between the drum unit and the whole unit	Check the terminal of the voltage PCB or exchange drum unit
18	Multiple feeding of recording paper	Dirty separation pad of the recording paper	Clean the separation pad recording paper
19	Skewed feeding of recording paper	Over the max capacity of the recording paper	Set up to MAX 150 sheets
		Too thick recording paper	Use the recording paper to 24lb
		other reason	
20	Wrinkle of recording paper	Too thin recording paper	Use the recording paper to 24lb
		other reason	
21	Document jam	The sensor cannot detect the top of document	Exchange the sensor or PCB
22	Multiple feeding of document	Dirty separation pad of the document	Clean the separation pad document
23	Skewed feeding of document	Not matched the document to the document slider	Adjust the document to t document slider
24	Copying all white (Printing pattern is OK)	Broken CIS	Exchange CIS
		Broken the digital PCB	Check the digital board
25	Copying all black (Printing pattern is OK)	Broken CIS	Exchange CIS
		Broken the digital PCB	Check the digital board
26	Copying disordered (Printing pattern is OK)	Broken CIS	Exchange CIS
		Broken the digital PCB	Check the digital board
27	Cannot print legal size	Not selected the legal mode	Select the legal mode in programming mode
28	Copying slight	Broken CIS	Exchange CIS
29	Cannot feed document	The Paper feed sensor cannot detect the document	Exchange the Paper feed or check the PCB
30	CHECK DRUM' on the LCD	No connection between the drum unit and the whole unit	Reset or exchange the dr
31	CHANGE DRUM' on the LCD	The Toner sensor cannot detect the drum unit	Exchange the Toner sens check the PCB
		Dust between the drum unit and the sensor	Remove the dust
		Metal dust under the drum unit	Remove the dust
32	FAILED PICKUP' on the LCD	Broken the resist sensor	Exchange the resist sens
33	PAPER JAM' on the LCD	Broken the exit sensor	Exchange the exit senso

No.	Symptom	Cause	Countermeasur
34	OUT OF PAPER' on the LCD	Broken the paper sensor	Exchange the paper sens
35	COVER OPEN' on the LCD	Broken the Top cover open SW	Exchange the Top cover
36	CHECK DOCUMENT' on the LCD	Broken the document sensor	Exchange the document
37	REMOVE DOCUMENT' on the LCD	Broken the paper feed sensor	Exchange the Paper feed
38	CALL SERVICE1	POLYGON unusual	+24V → DIGITAL BOARD CHECK
39	CALL SERVICE2	LASER unusual	+5V → DIGITAL BOARD - CHECK
40	CALL SERVICE3	FUSER TEMPERATURE unusual	CONECTOR → FUSER → THERMISTOR → DIGITAL CHECK
41	CALL SERVICE4	FAN MOTOR unusual	CONECTOR → FAN → DIGITAL BOARD CHECK

2.3.3.3. CALL SERVICE TROUBLESHOOTING GUIDE

Call Service related error is most frequent.
Call Service 1 ----- Polygon doesn’t rotate......... Refer to LSU (Laser Scanning Unit) SECTION ().

- **First, listen to the sound. If rotation sound isn't heard, check 24V line, POLON signal and POLCLK signal. If even a little of sound is heard, check XREADY signal.**

Call Service 2 ----- Laser isn't output.......... Refer to LSU (Laser Scanning Unit) SECTION ()

- **This can be judged only by referring to signal. Check 5V line, LDEN and VIDEO.**

Call Service 3 ----- Detection of fixing temperature.......... Refer to HEAT LAMP CONTROL CIRCUIT ()

- **The most possible reason is that connector isn't engaged firmly. And comparator (IC610) on the digital PCB might be broken because of static electricity. There are 2 kinds of temperature errors, "low temperature error", which means that low voltage is input to the comparator and "high temperature error", which means that high voltage is input to the comparator.**

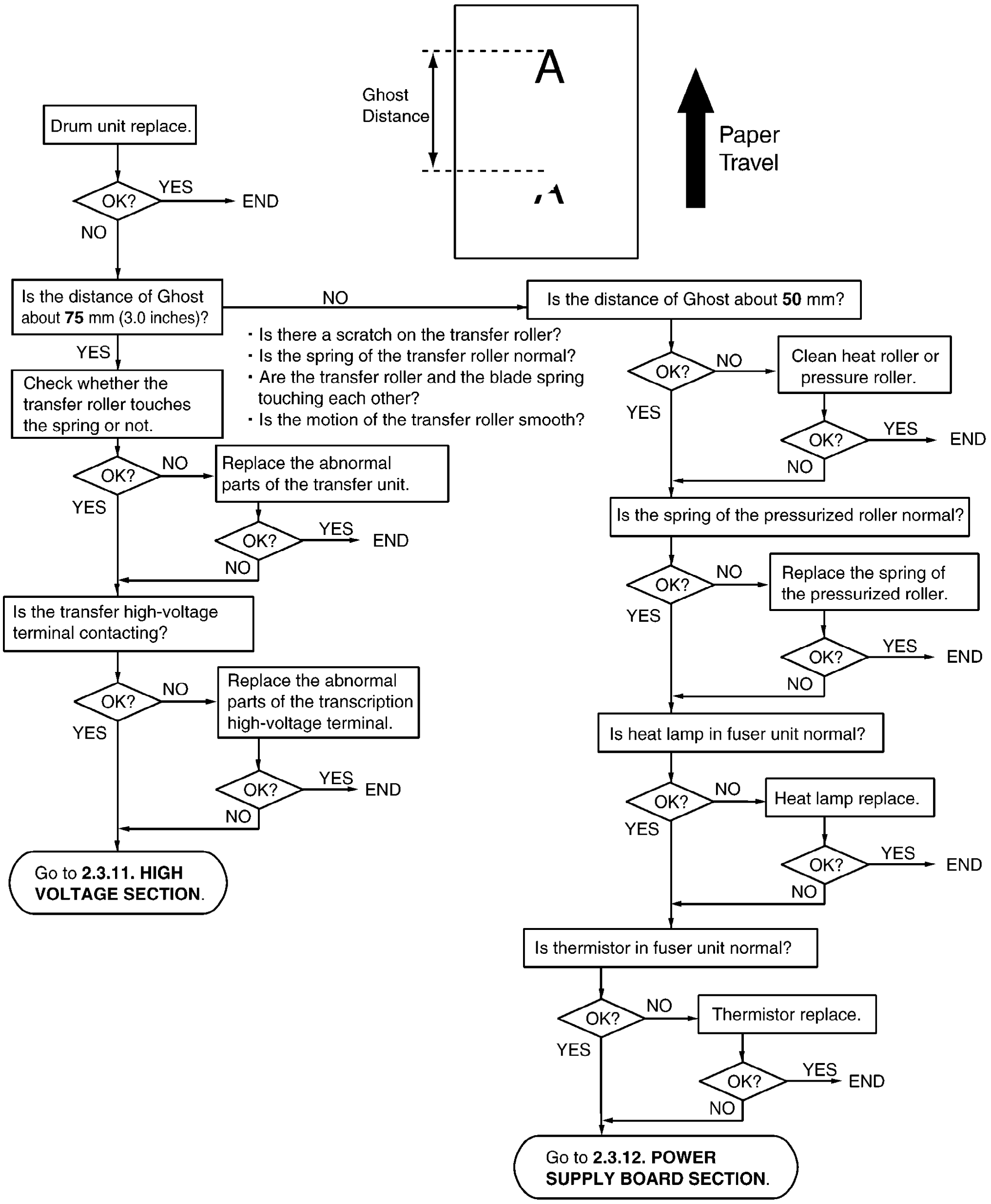
Call Service 4 ----- Rotation of Fan.......... Refer to FAN MOTOR SECTION ()

- **Connector isn't engaged firmly, foreign material is mingled and the fan is broken.**

Once "CALL SERVICE" is displayed, it doesn't turn off until factory setup is conducted. Therefore, do factory setup before the identification and do factory setup again after countermeasure is taken.

2.3.4. PRINT

2.3.4.1. GHOST IMAGE

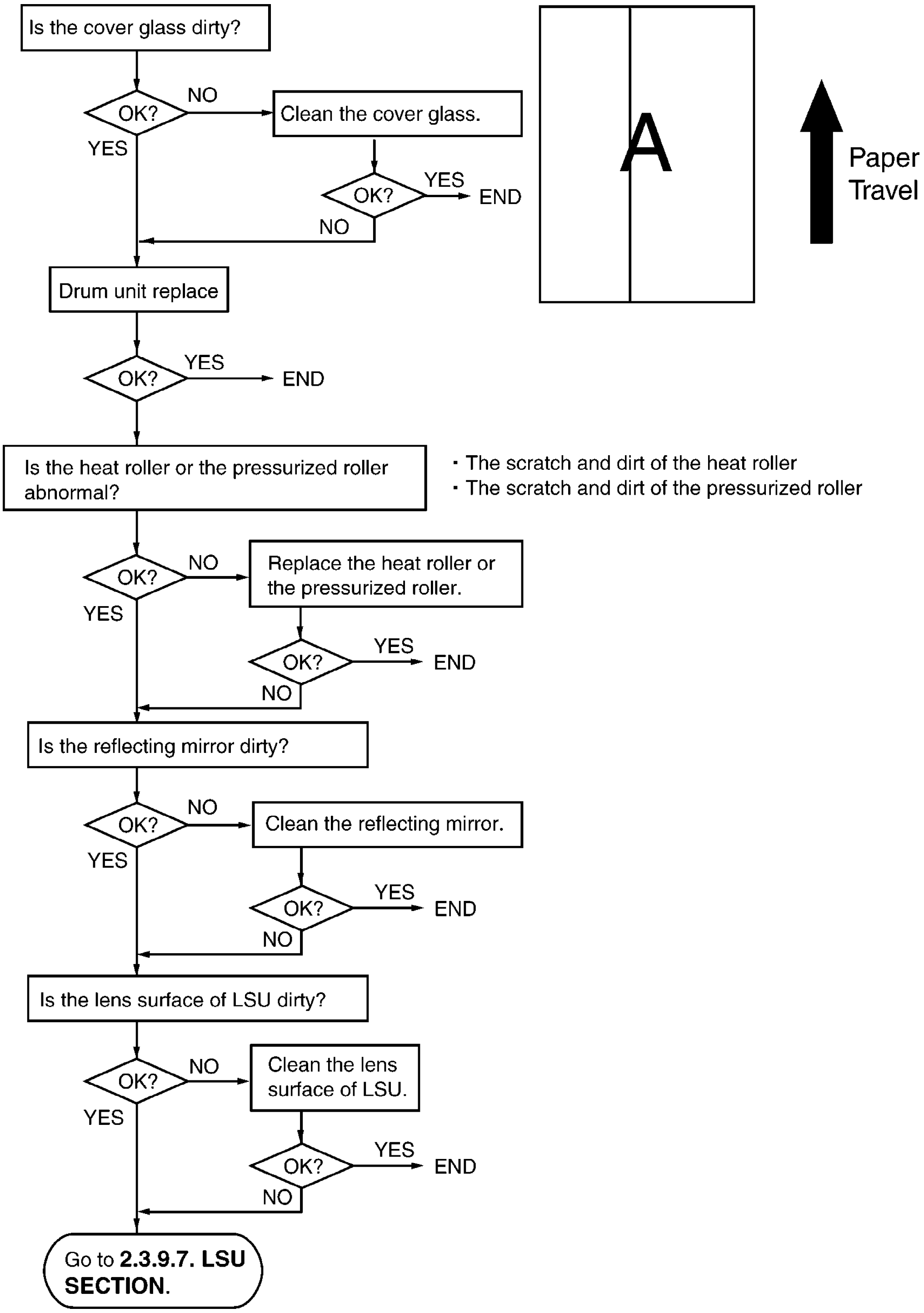

Ghost Distance
A
Paper Travel
Drum unit replace.
OK?
YES
END
NO
Is the distance of Ghost about 75 mm (3.0 inches)?
NO
Is the distance of Ghost about 50 mm?
YES
Check whether the transfer roller touches the spring or not.
· Is there a scratch on the transfer roller?
· Is the spring of the transfer roller normal?
· Are the transfer roller and the blade spring touching each other?
· Is the motion of the transfer roller smooth?
OK?
NO
Replace the abnormal parts of the transfer unit.
YES
OK?
YES
END
NO
Is the transfer high-voltage terminal contacting?
OK?
NO
Replace the abnormal parts of the transcription high-voltage terminal.
YES
OK?
YES
END
NO
Go to 2.3.11. HIGH VOLTAGE SECTION.
OK?
NO
Clean heat roller or pressure roller.
YES
OK?
YES
END
NO
Is the spring of the pressurized roller normal?
OK?
NO
Replace the spring of the pressurized roller.
YES
OK?
YES
END
NO
Is heat lamp in fuser unit normal?
OK?
NO
Heat lamp replace.
YES
OK?
YES
END
NO
Is thermistor in fuser unit normal?
OK?
NO
Thermistor replace.
YES
OK?
YES
END
NO
Go to 2.3.12. POWER SUPPLY BOARD SECTION.

CROSS REFERENCE:

HIGH VOLTAGE SECTION()

POWER SUPPLY BOARD SECTION()

2.3.4.2. DARK AND WHITE VERTICAL LINE


Is the cover glass dirty?
OK?
NO
YES
Clean the cover glass.
OK?
YES
END
NO
Drum unit replace
OK?
YES
END
Is the heat roller or the pressurized roller abnormal?
・The scratch and dirt of the heat roller
・The scratch and dirt of the pressurized roller
OK?
NO
YES
Replace the heat roller or the pressurized roller.
OK?
YES
END
NO
Is the reflecting mirror dirty?
OK?
NO
YES
Clean the reflecting mirror.
OK?
YES
END
NO
Is the lens surface of LSU dirty?
OK?
NO
YES
Clean the lens surface of LSU.
OK?
YES
END
NO
Go to 2.3.9.7. LSU SECTION.
A
Paper Travel

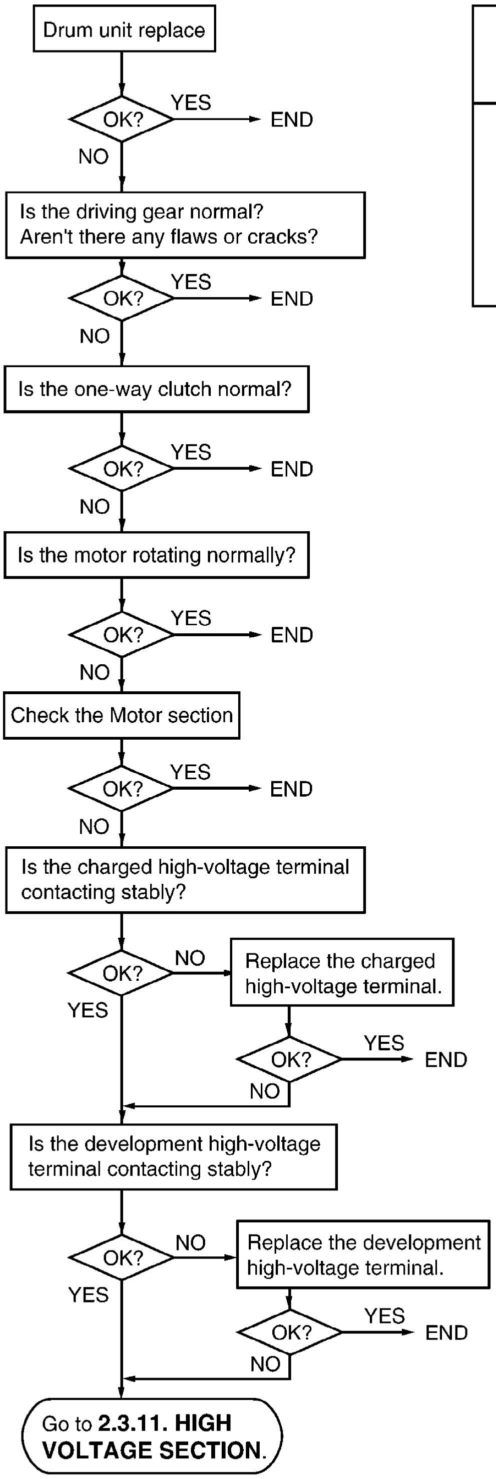
Note:

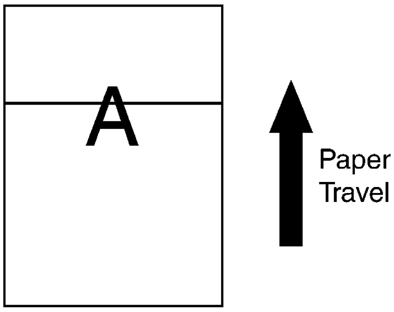
When wiping the cover glass, reflecting mirror and LSU lens, use a dry and soft cloth.

CROSS REFERENCE:

LSU SECTION ()

2.3.4.3. DARK OR WHITE HORIZONTAL LINE


Drum unit replace
OK?
YES
END
NO
Is the driving gear normal? Aren't there any flaws or cracks?
OK?
YES
END
NO
Is the one-way clutch normal?
OK?
YES
END
NO
Is the motor rotating normally?
OK?
YES
END
NO
Check the Motor section
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
OK?
YES
END
NO
YES
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
OK?
YES
END
NO
YES
Go to **2.3.11. HIGH VOLTAGE SECTION**.


A
Paper
Travel

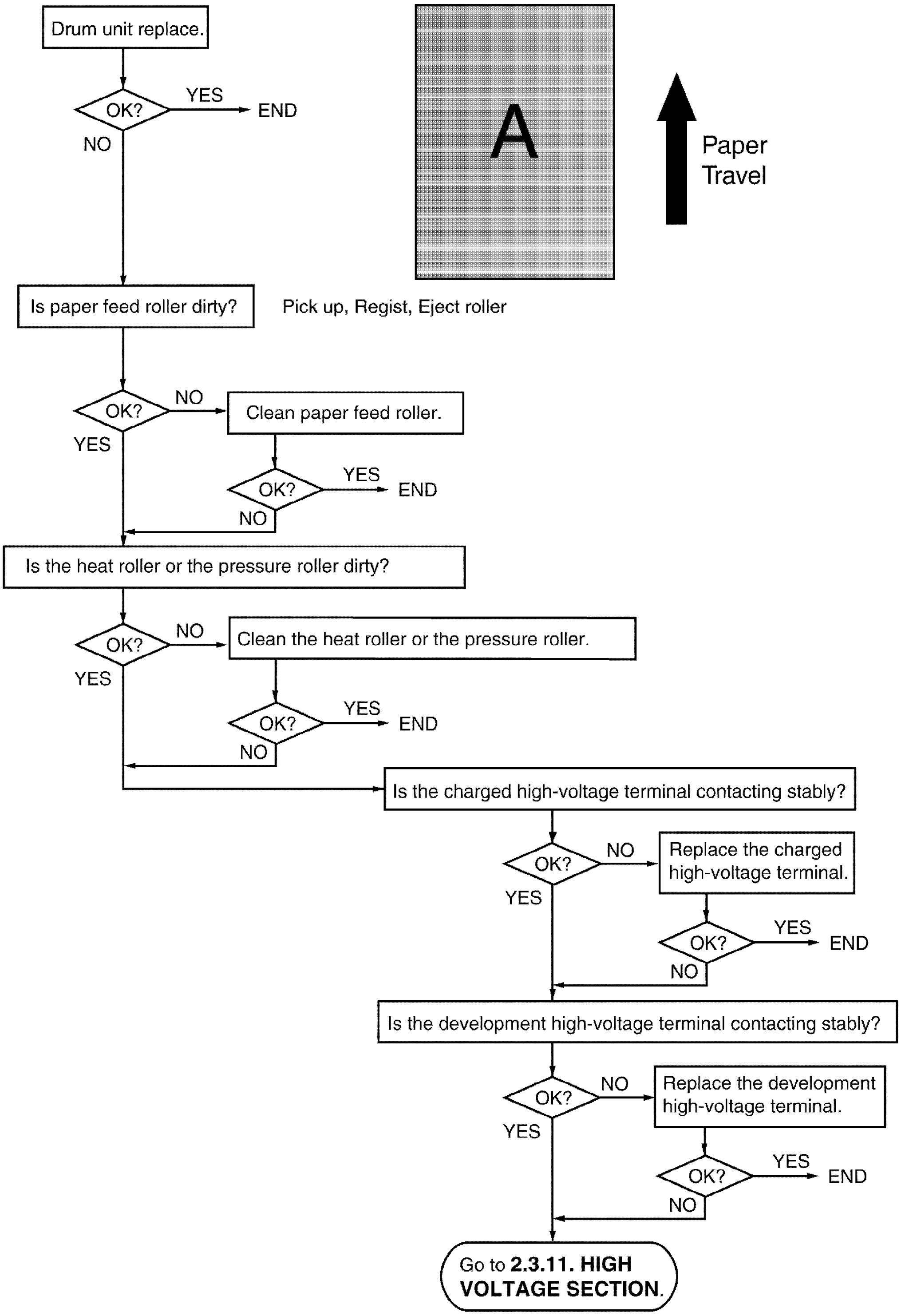
・It is necessary to describe the information about the lines that cannot be troubleshooted in such as halftone.

・When there is the information about the troubleshooted horizontal line, please add the description of it.

CROSS REFERENCE:

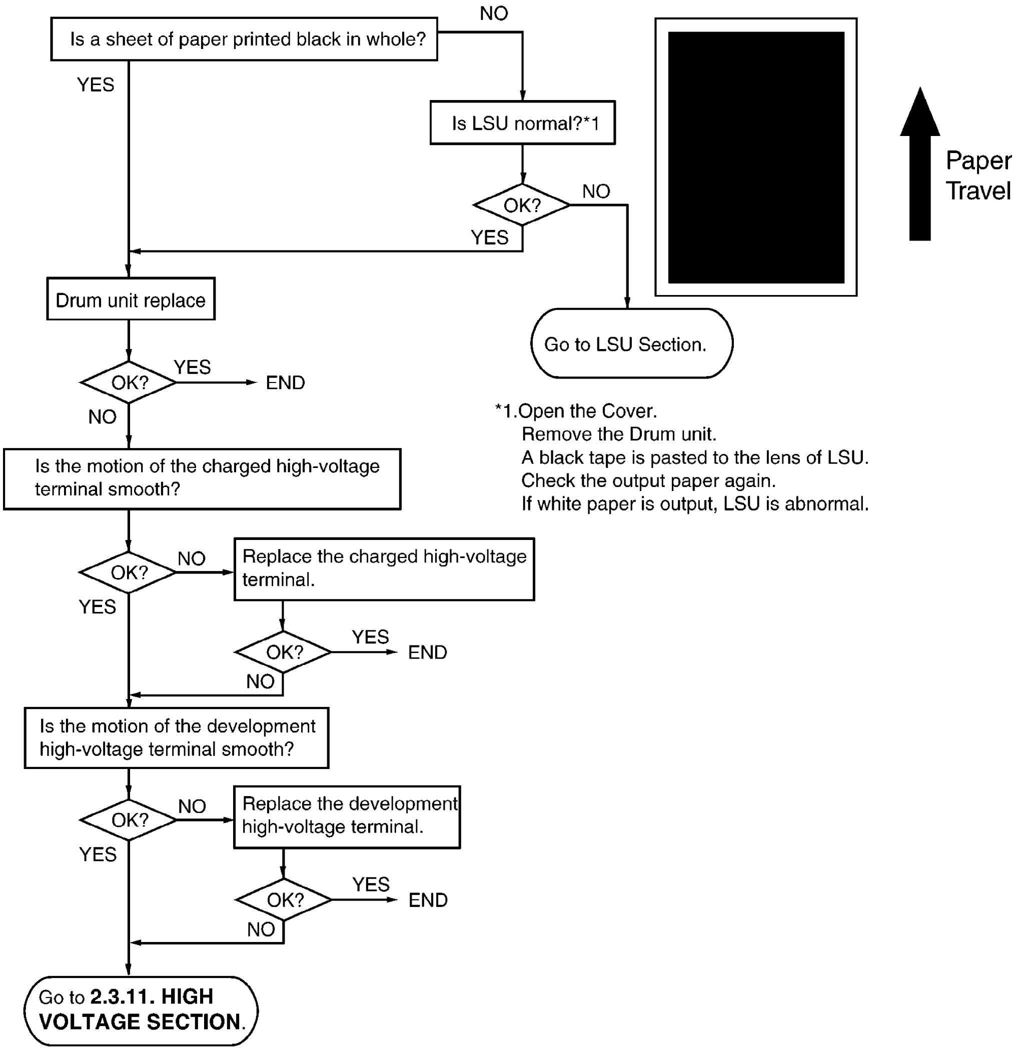
HIGH VOLTAGE SECTION ()

2.3.4.4. DIRTY AND HALF DARKNESS BACKGROUND


Drum unit replace.
OK?
YES
END
NO
A
Paper Travel
Is paper feed roller dirty?
Pick up, Regist, Eject roller
OK?
NO
Clean paper feed roller.
YES
OK?
YES
END
NO
Is the heat roller or the pressure roller dirty?
OK?
NO
Clean the heat roller or the pressure roller.
YES
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to **2.3.11. HIGH VOLTAGE SECTION**.

CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

2.3.4.5. BLACK PRINT

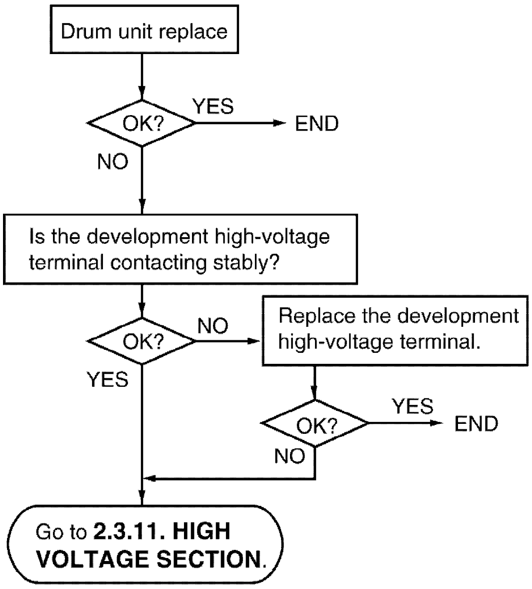

Is a sheet of paper printed black in whole?
NO
YES
Is LSU normal?*1
OK?
NO
YES
Drum unit replace
Go to LSU Section.
OK?
YES
END
NO
Is the motion of the charged high-voltage terminal smooth?
OK?
NO
YES
Replace the charged high-voltage terminal.
OK?
YES
END
NO
Is the motion of the development high-voltage terminal smooth?
OK?
NO
YES
Replace the development high-voltage terminal.
OK?
YES
END
NO
Go to **2.3.11. HIGH VOLTAGE SECTION**.
Paper Travel

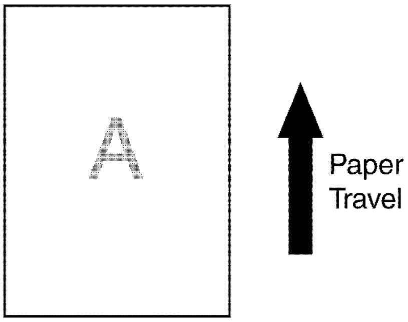
*1.Open the Cover.
Remove the Drum unit.
A black tape is pasted to the lens of LSU.
Check the output paper again.
If white paper is output, LSU is abnormal.

CROSS REFERENCE:

HIGH VOLTAGE SECTION ()

2.3.4.6. LIGHT PRINT

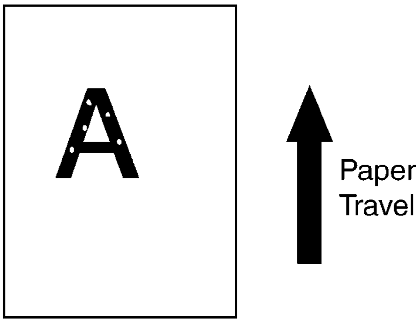

Drum unit replace
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to **2.3.11. HIGH VOLTAGE SECTION**.

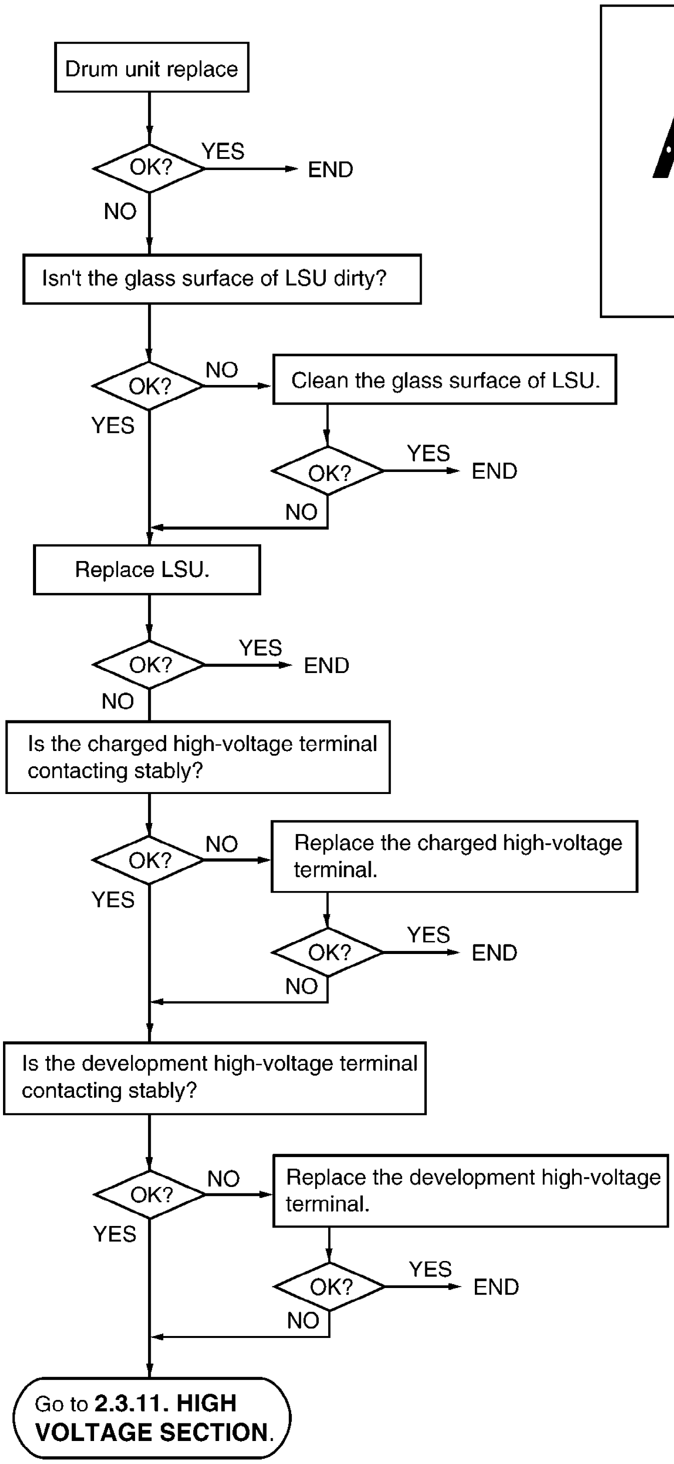

A
Paper Travel

CROSS REFERENCE:

HIGH VOLTAGE SECTION **()**

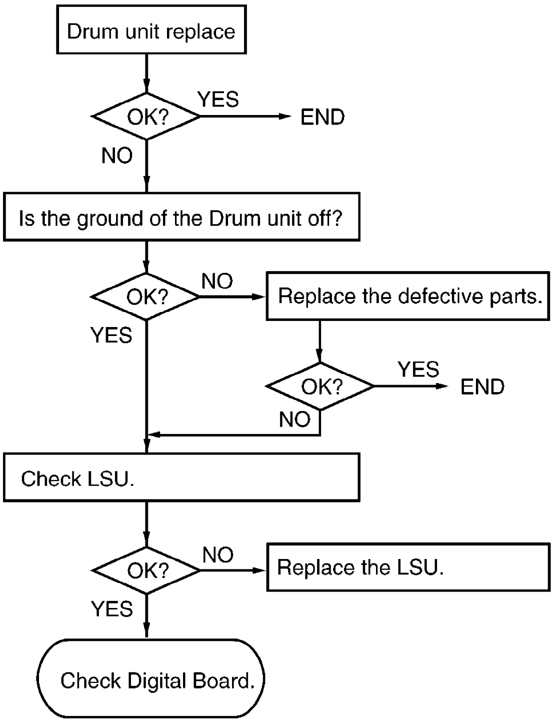
2.3.4.7. BLACK DENSITY IS LIGHT OR UNEVEN.

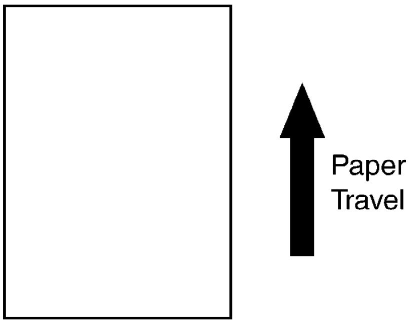

A
Paper
Travel


Drum unit replace
OK?
YES
END
NO
Isn't the glass surface of LSU dirty?
OK?
NO
Clean the glass surface of LSU.
YES
OK?
YES
END
NO
Replace LSU.
OK?
YES
END
NO
Is the charged high-voltage terminal contacting stably?
OK?
NO
Replace the charged high-voltage terminal.
YES
OK?
YES
END
NO
Is the development high-voltage terminal contacting stably?
OK?
NO
Replace the development high-voltage terminal.
YES
OK?
YES
END
NO
Go to 2.3.11. HIGH VOLTAGE SECTION.

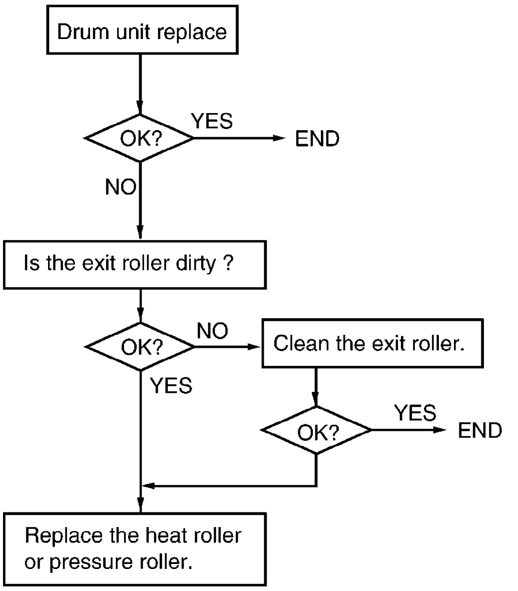
CROSS REFERENCE:
HIGH VOLTAGE SECTION ()

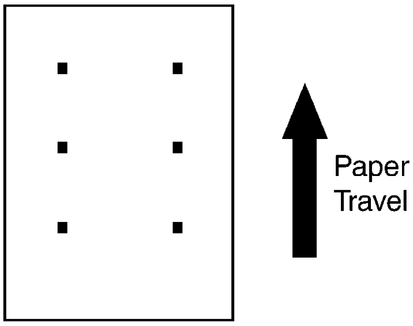
2.3.4.8. BLANK PRINT

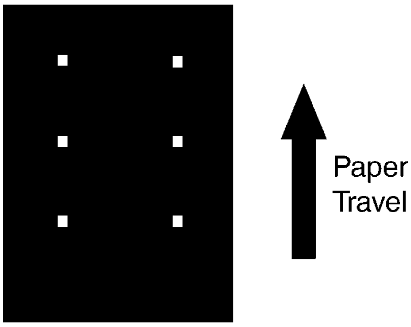

Drum unit replace
OK?
YES
END
NO
Is the ground of the Drum unit off?
OK?
NO
Replace the defective parts.
YES
OK?
YES
END
NO
Check LSU.
OK?
NO
Replace the LSU.
YES
Check Digital Board.


Paper
Travel

2.3.4.9. BLACK, WHIT POINT

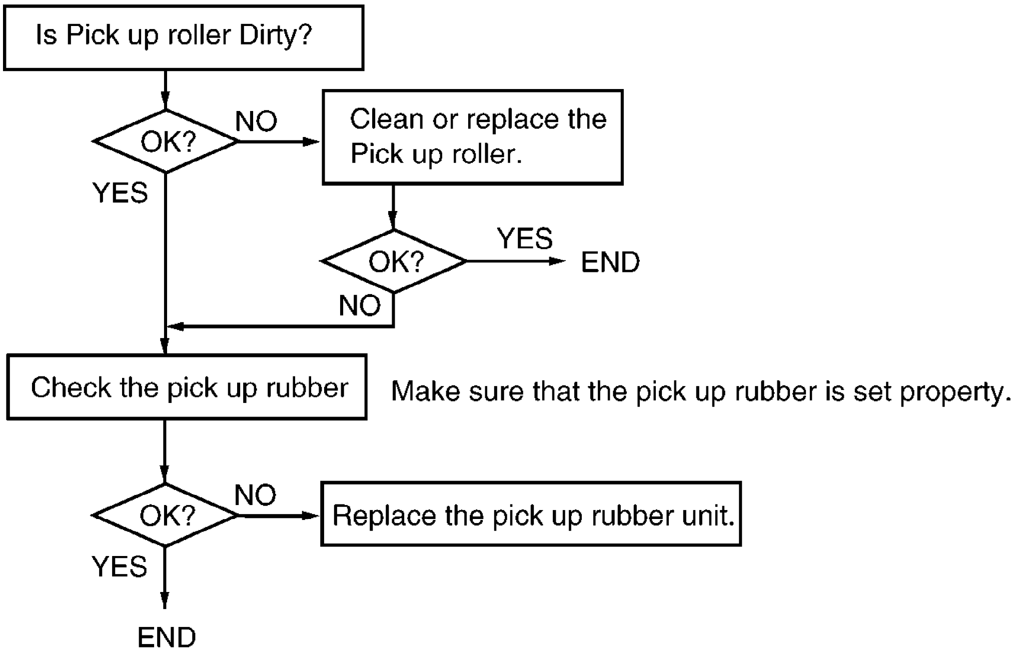

Drum unit replace
OK?
YES
END
NO
Is the exit roller dirty ?
OK?
NO
Clean the exit roller.
YES
OK?
YES
END
Replace the heat roller
or pressure roller.


Paper
Travel

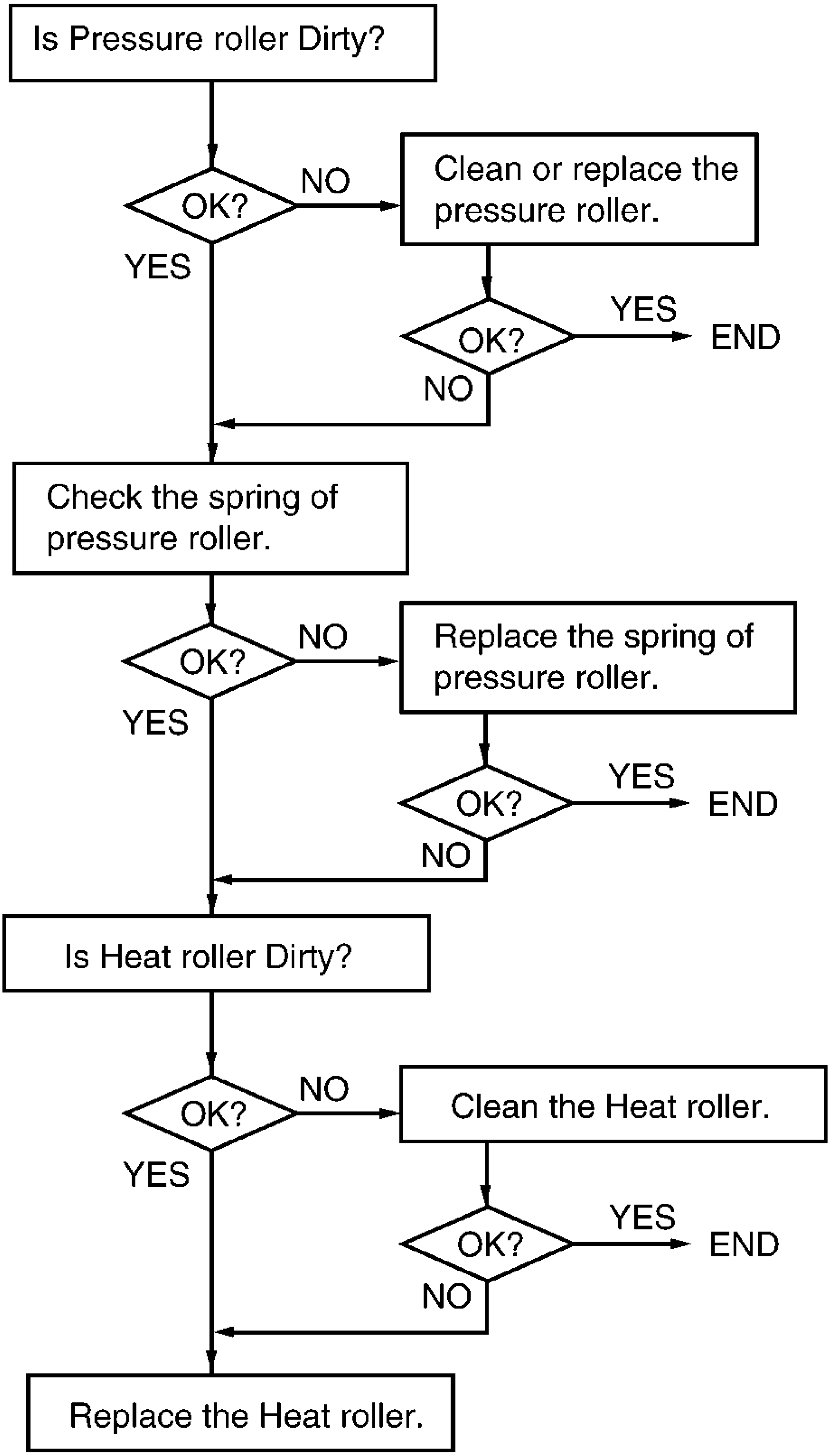

Paper
Travel

2.3.5. RECORDING PAPER FEED

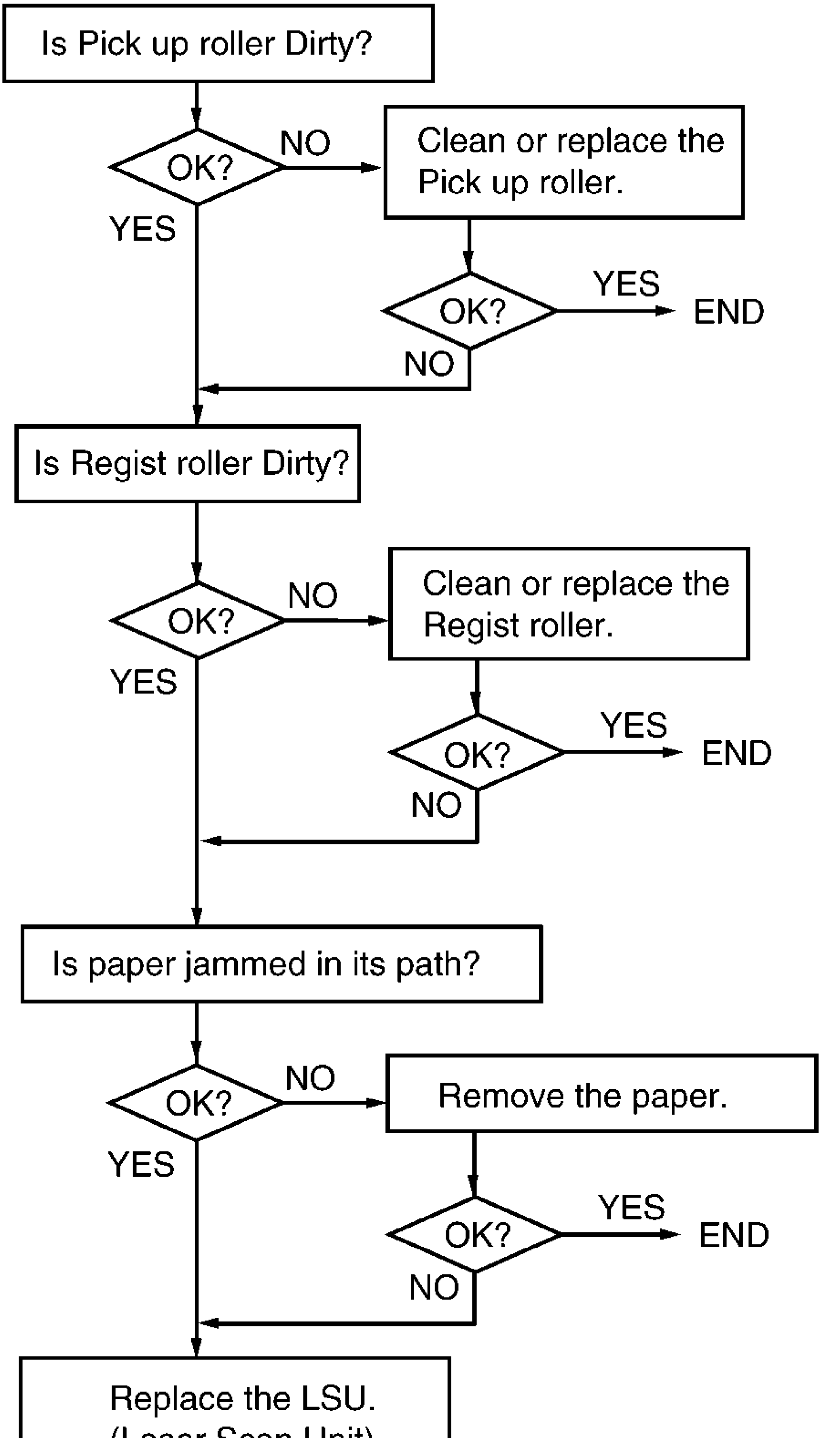
2.3.5.1. MULTIPLE FEED


Is Pick up roller Dirty?
OK?
NO
YES
Clean or replace the Pick up roller.
OK?
YES
END
NO
Check the pick up rubber
Make sure that the pick up rubber is set property.
OK?
NO
Replace the pick up rubber unit.
YES
END

2.3.5.2. THE PRINTING PAPER IS WAVED OR WRINKLED

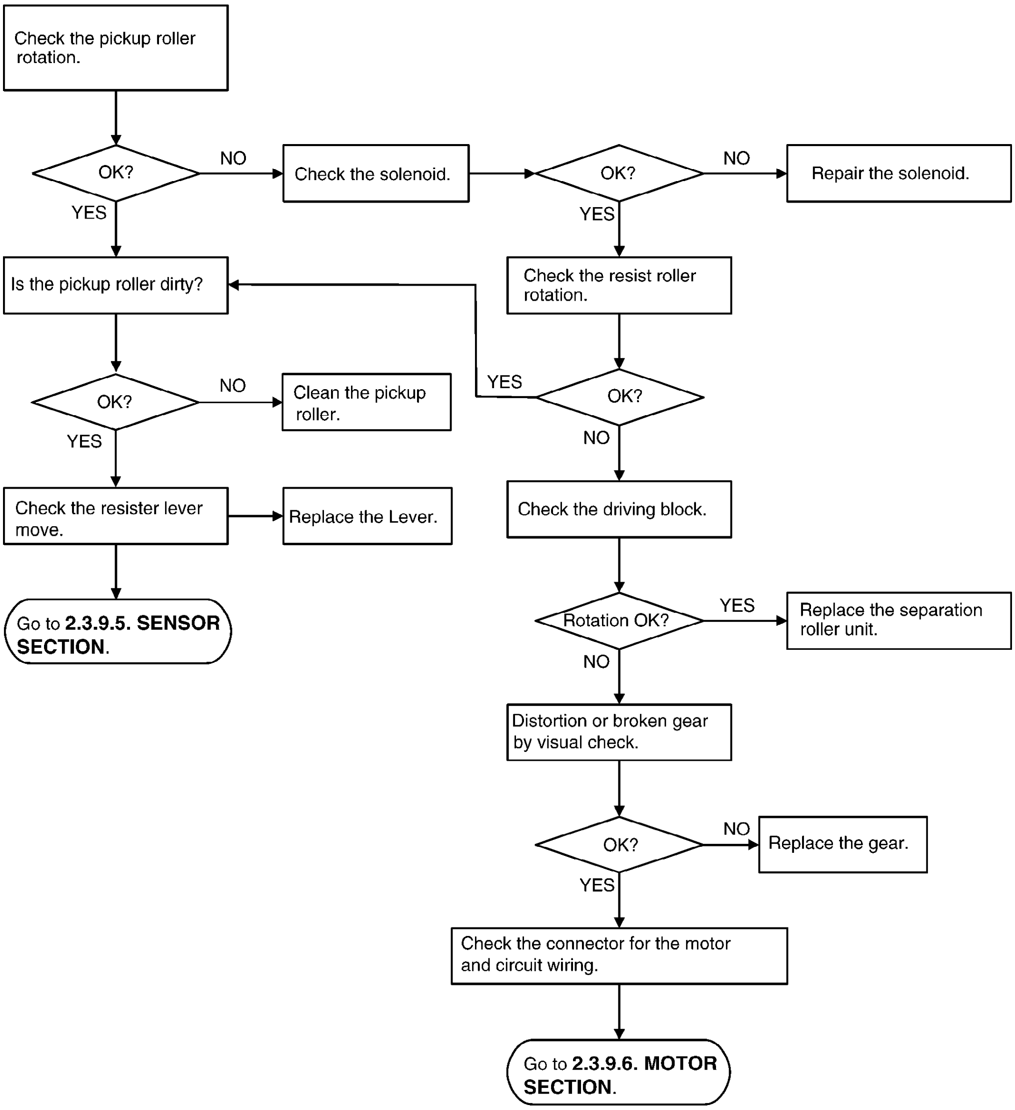

Is Pressure roller Dirty?
OK?
NO
YES
Clean or replace the pressure roller.
OK?
YES
END
NO
Check the spring of pressure roller.
OK?
NO
YES
Replace the spring of pressure roller.
OK?
YES
END
NO
Is Heat roller Dirty?
OK?
NO
YES
Clean the Heat roller.
OK?
YES
END
NO
Replace the Heat roller.

2.3.5.3. SKEW


Is Pick up roller Dirty?
OK?
NO
Clean or replace the Pick up roller.
YES
OK?
YES
END
NO
Is Regist roller Dirty?
OK?
NO
Clean or replace the Regist roller.
YES
OK?
YES
END
NO
Is paper jammed in its path?
OK?
NO
Remove the paper.
YES
OK?
YES
END
NO
Replace the LSU.

(Laser Scan Unit)

2.3.5.4. THE RECORDING PAPER DOES NOT FEED


Check the pickup roller rotation.
OK?
NO
YES
Check the solenoid.
OK?
NO
YES
Repair the solenoid.
Is the pickup roller dirty?
Check the resist roller rotation.
OK?
NO
YES
Clean the pickup roller.
YES
OK?
NO
Check the resister lever move.
Replace the Lever.
Check the driving block.
Go to 2.3.9.5. SENSOR SECTION.
Rotation OK?
YES
NO
Replace the separation roller unit.
Distortion or broken gear by visual check.
OK?
NO
YES
Replace the gear.
Check the connector for the motor and circuit wiring.
Go to 2.3.9.6. MOTOR SECTION.

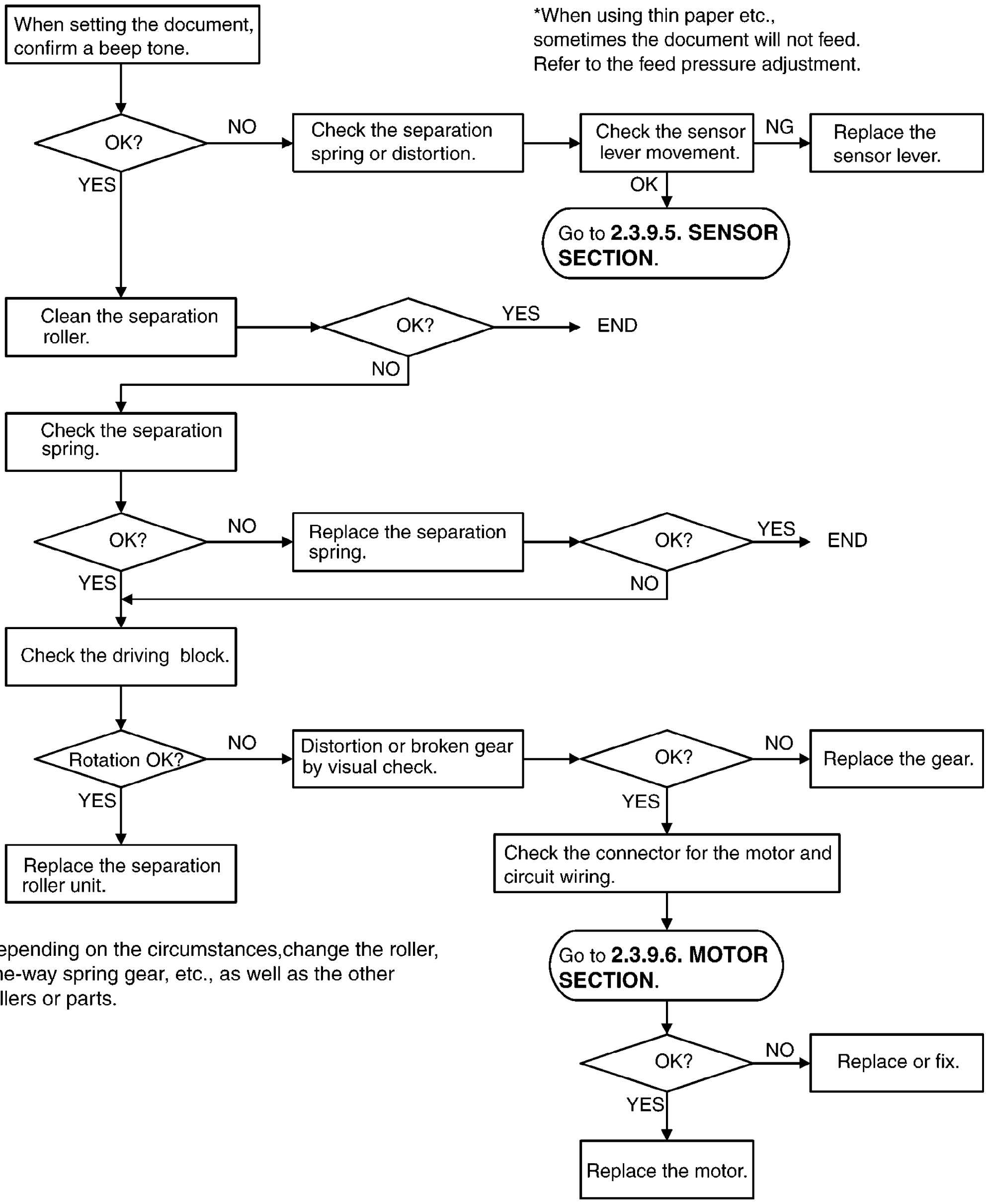
CROSS REFERENCE:

SENSOR SECTION ()

MOTOR SECTION ()

2.3.6. ADF(Auto document feed) SECTION

2.3.6.1. NO DOCUMENT FEED


When setting the document, confirm a beep tone.
OK?
NO
YES
Check the separation spring or distortion.
Check the sensor lever movement.
NG
Replace the sensor lever.
OK
Go to **2.3.9.5. SENSOR SECTION**.
Clean the separation roller.
OK?
YES
END
NO
Check the separation spring.
OK?
NO
YES
Replace the separation spring.
OK?
YES
END
NO
Check the driving block.
Rotation OK?
NO
YES
Distortion or broken gear by visual check.
OK?
NO
Replace the gear.
YES
Replace the separation roller unit.
Check the connector for the motor and circuit wiring.
Go to **2.3.9.6. MOTOR SECTION**.
OK?
NO
Replace or fix.
YES
Replace the motor.

*When using thin paper etc., sometimes the document will not feed. Refer to the feed pressure adjustment.

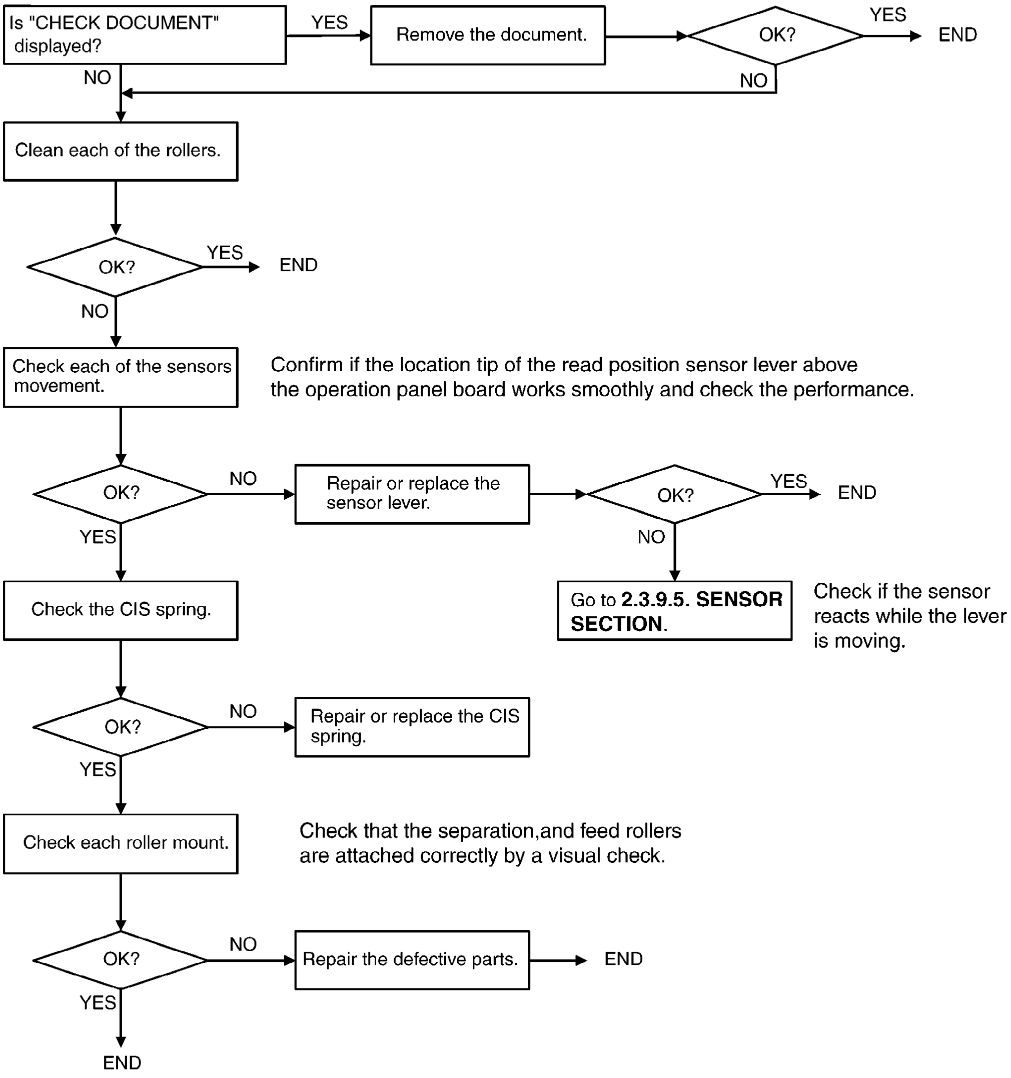
Depending on the circumstances,change the roller, one-way spring gear, etc., as well as the other rollers or parts.

CROSS REFERENCE:

SENSOR SECTION ()

MOTOR SECTION ()

2.3.6.2. DOCUMENT JAM

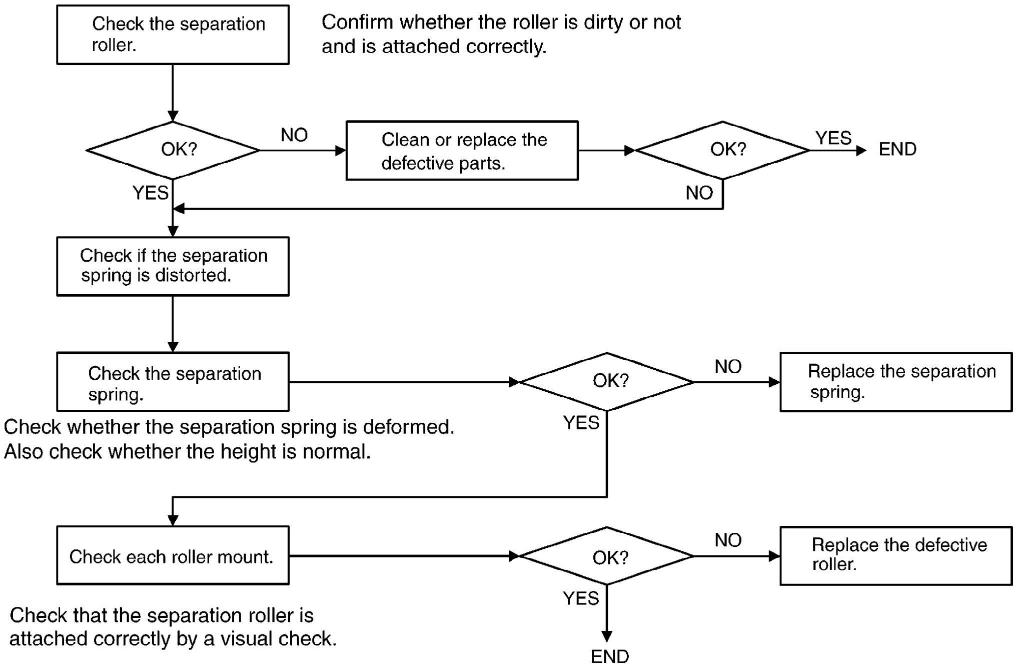

Is "CHECK DOCUMENT" displayed?
YES
Remove the document.
OK?
YES
END
NO
NO
Clean each of the rollers.
OK?
YES
END
NO
Check each of the sensors movement.
Confirm if the location tip of the read position sensor lever above the operation panel board works smoothly and check the performance.
OK?
NO
Repair or replace the sensor lever.
OK?
YES
END
NO
YES
Check the CIS spring.
Go to 2.3.9.5. SENSOR SECTION.
Check if the sensor reacts while the lever is moving.
OK?
NO
Repair or replace the CIS spring.
YES
Check each roller mount.
Check that the separation,and feed rollers are attached correctly by a visual check.
OK?
NO
Repair the defective parts.
END
YES
END

CROSS REFERENCE:

SENSOR SECTION ()

2.3.6.3. MULTIPLE FEED

When using thick paper etc., sometimes the document will not feed.


Check the separation roller.
OK?
NO
Clean or replace the defective parts.
OK?
YES
END
NO
YES
Check if the separation spring is distorted.
Check the separation spring.
OK?
NO
Replace the separation spring.
YES
Check each roller mount.
OK?
NO
Replace the defective roller.
YES
END

Confirm whether the roller is dirty or not and is attached correctly.

Check whether the separation spring is deformed.
Also check whether the height is normal.

Check that the separation roller is attached correctly by a visual check.

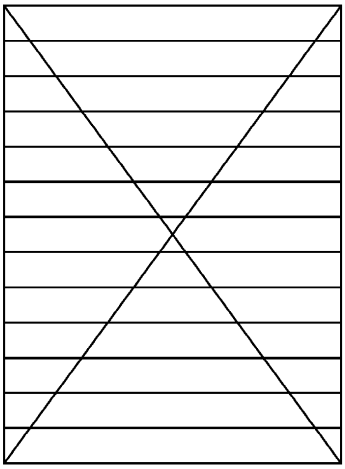
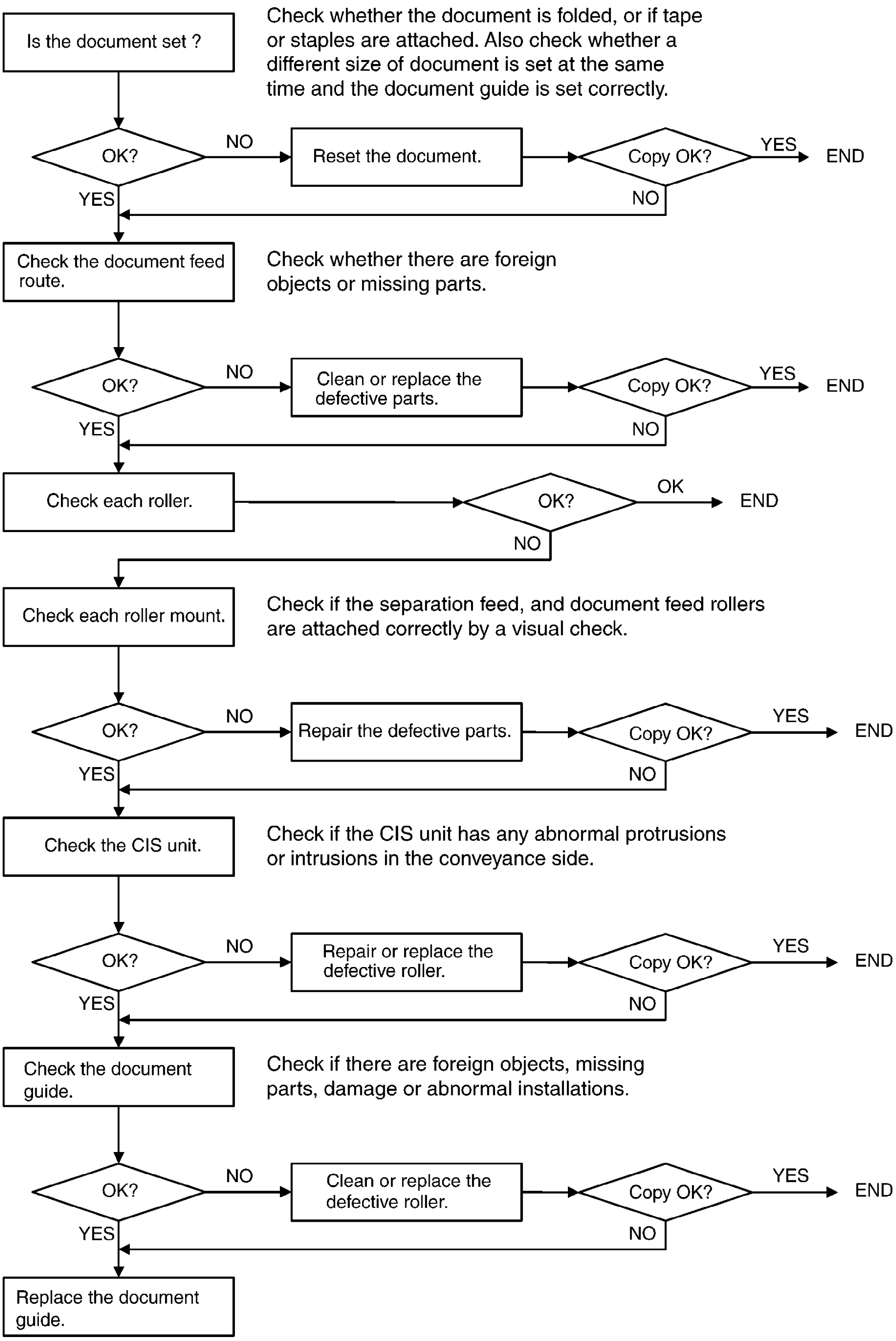


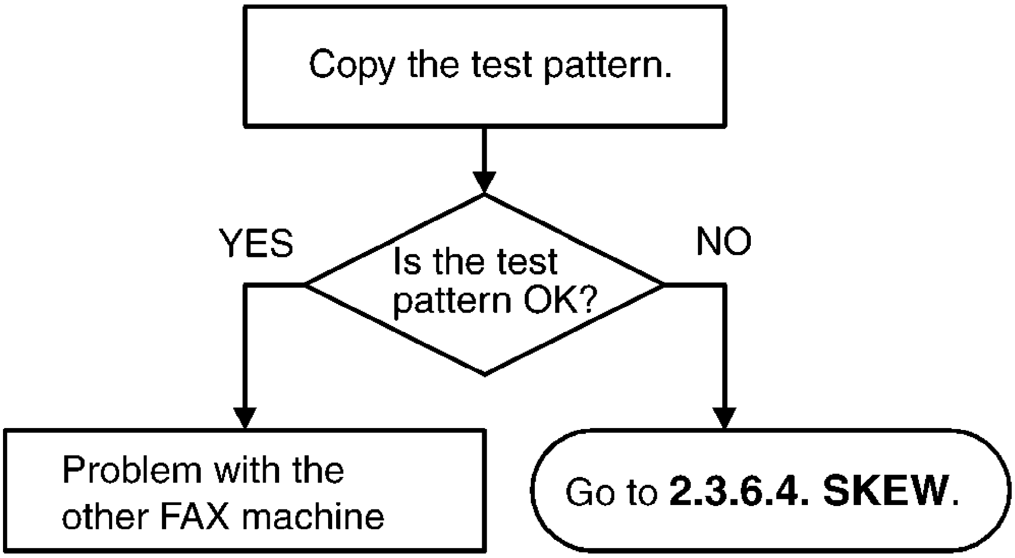
Fig. b

When confirming if the characters are extended or distorted on,if the feed problem occurs,use this test chart. (Fig b)

2.3.6.4. SKEW

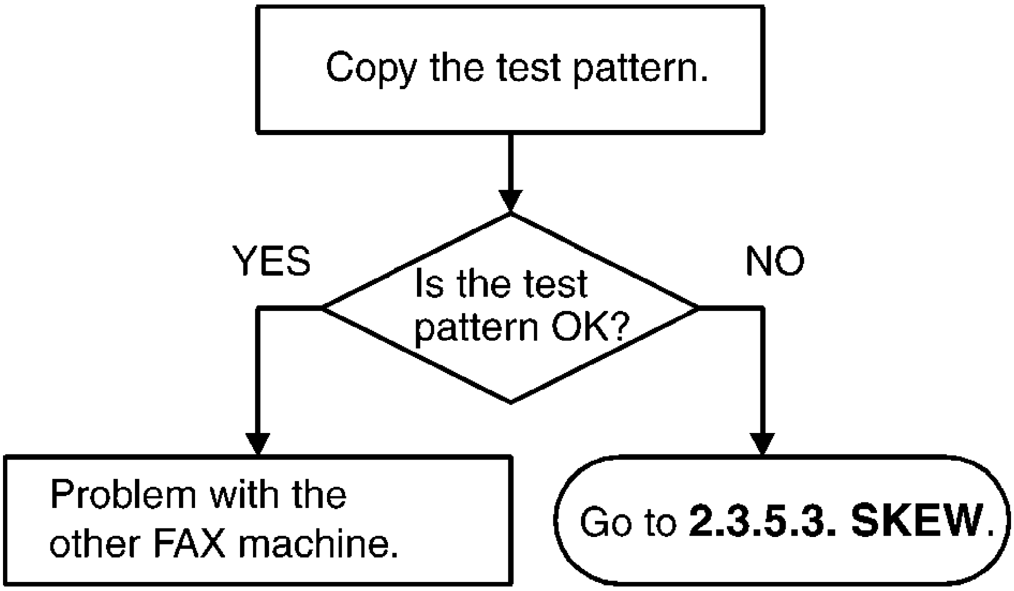

Is the document set ?
Check whether the document is folded, or if tape or staples are attached. Also check whether a different size of document is set at the same time and the document guide is set correctly.
OK?
NO
Reset the document.
Copy OK?
YES
END
NO
YES
Check the document feed route.
Check whether there are foreign objects or missing parts.
OK?
NO
Clean or replace the defective parts.
Copy OK?
YES
END
NO
YES
Check each roller.
OK?
OK
END
NO
Check each roller mount.
Check if the separation feed, and document feed rollers are attached correctly by a visual check.
OK?
NO
Repair the defective parts.
Copy OK?
YES
END
NO
YES
Check the CIS unit.
Check if the CIS unit has any abnormal protrusions or intrusions in the conveyance side.
OK?
NO
Repair or replace the defective roller.
Copy OK?
YES
END
NO
YES
Check the document guide.
Check if there are foreign objects, missing parts, damage or abnormal installations.
OK?
NO
Clean or replace the defective roller.
Copy OK?
YES
END
NO
YES
Replace the document guide.

2.3.6.5. THE SENT FAX DATA IS SKEWED


Copy the test pattern.
Is the test pattern OK?
YES
NO
Problem with the other FAX machine
Go to **2.3.6.4. SKEW**.

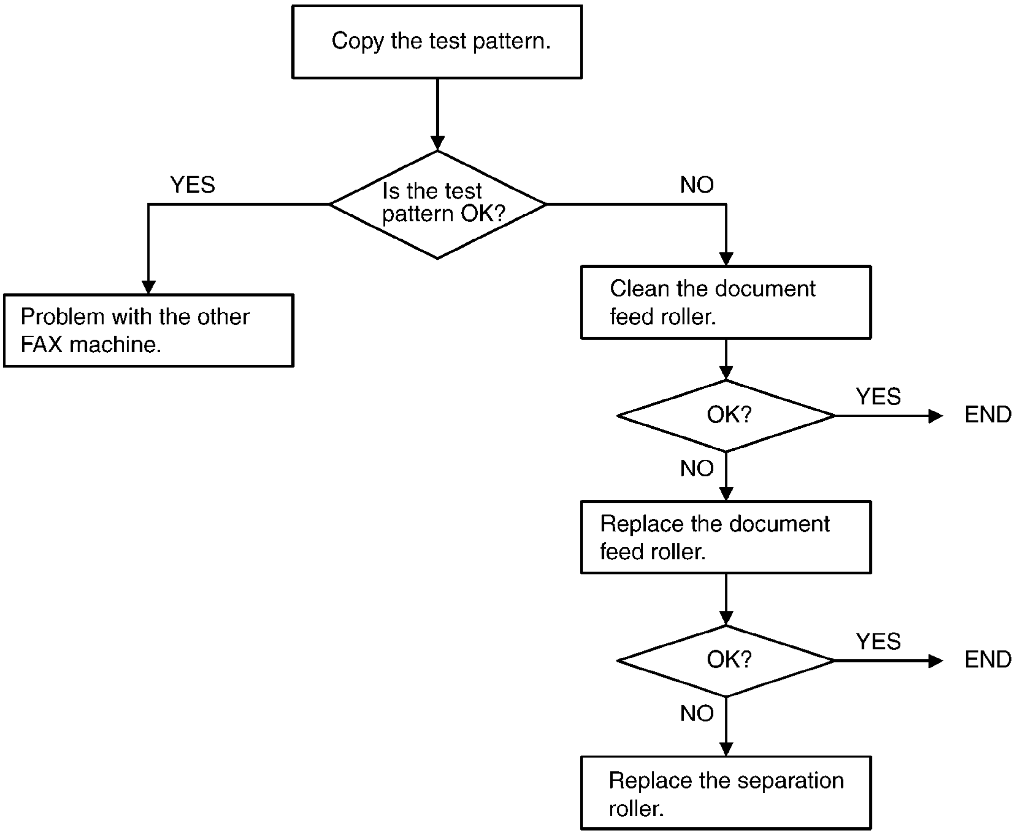
CROSS REFERENCE:
SKEW ()

2.3.6.6. THE RECEIVED FAX DATA IS SKEWED

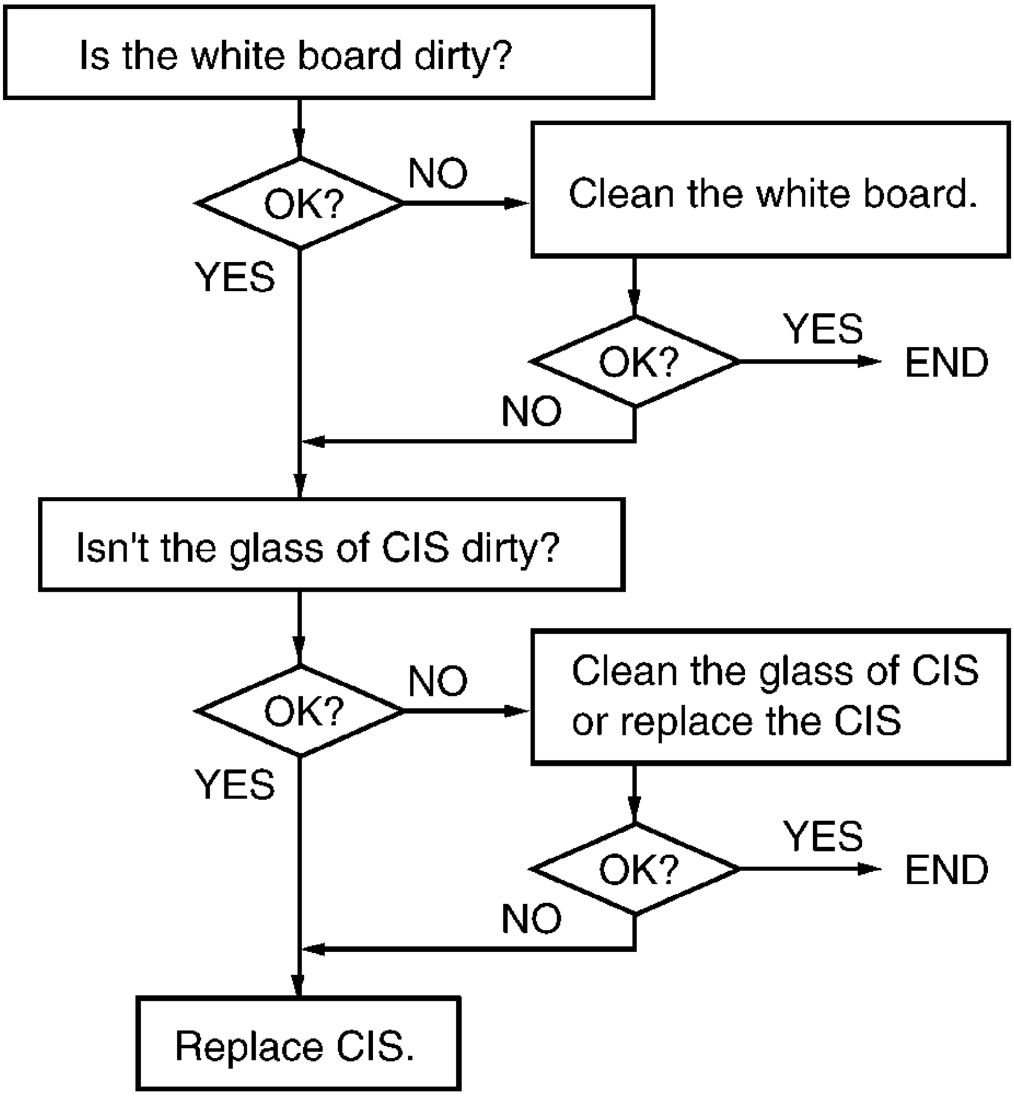

Copy the test pattern.
Is the test pattern OK?
YES
NO
Problem with the other FAX machine.
Go to **2.3.5.3. SKEW**.

CROSS REFERENCE:
SKEW ()

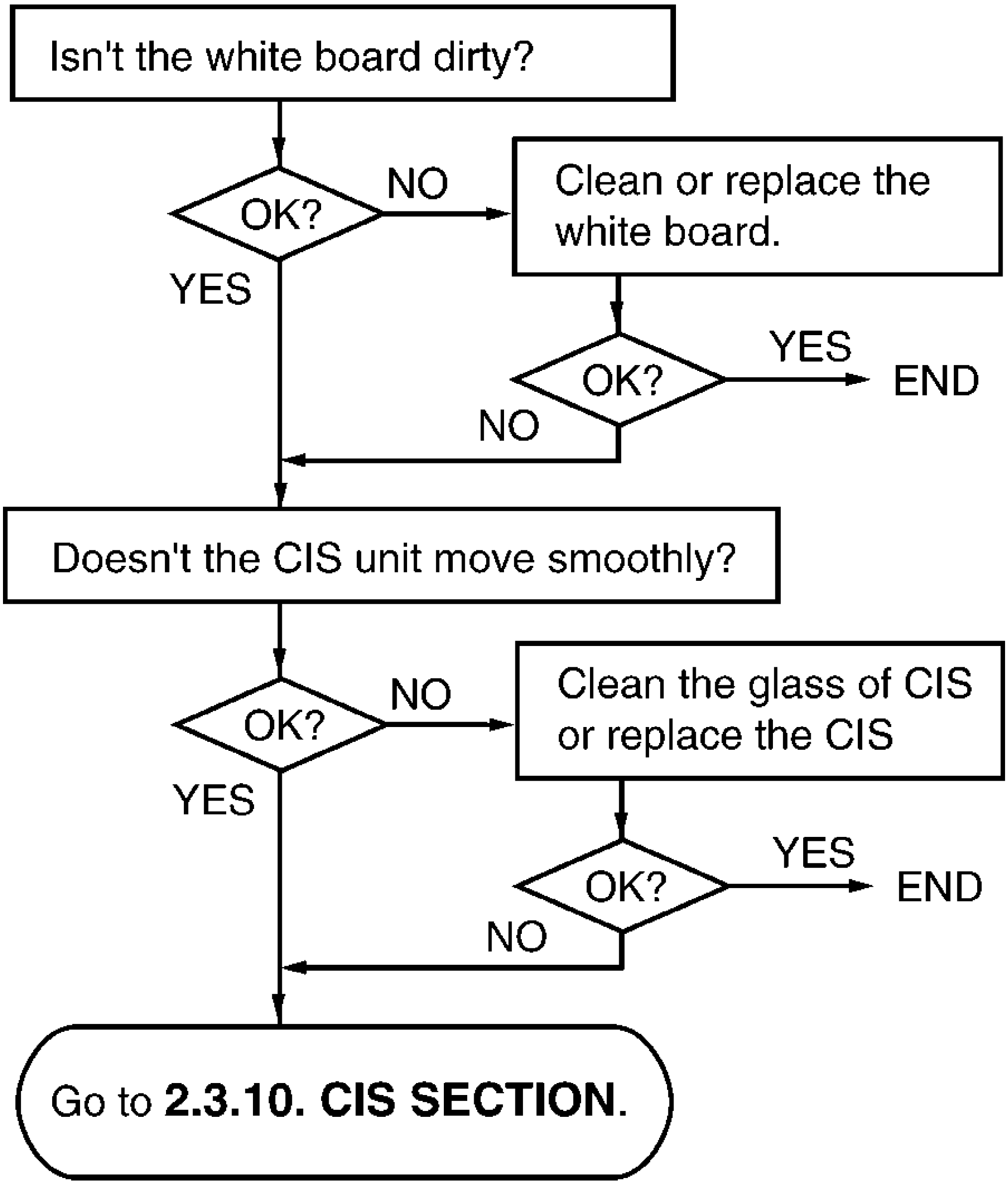
2.3.6.7. THE RECEIVED OR COPIED DATA IS EXPANDED


Copy the test pattern.
YES
Is the test pattern OK?
NO
Problem with the other FAX machine.
Clean the document feed roller.
OK?
YES
END
NO
Replace the document feed roller.
OK?
YES
END
NO
Replace the separation roller.

2.3.6.8. BLACK OR WHITE VERTICAL LINE


Is the white board dirty?
OK?
NO
YES
Clean the white board.
OK?
YES
END
NO
Isn't the glass of CIS dirty?
OK?
NO
YES
Clean the glass of CIS or replace the CIS
OK?
YES
END
NO
Replace CIS.

2.3.6.9. AN ABNORMAL IMAGE IS COPIED


Isn't the white board dirty?
OK?
NO
Clean or replace the white board.
YES
OK?
YES
END
NO
Doesn't the CIS unit move smoothly?
OK?
NO
Clean the glass of CIS or replace the CIS
YES
OK?
YES
END
NO
Go to **2.3.10. CIS SECTION**.

CROSS REFERENCE:
CIS (contact Image Sensor) SECTION ()

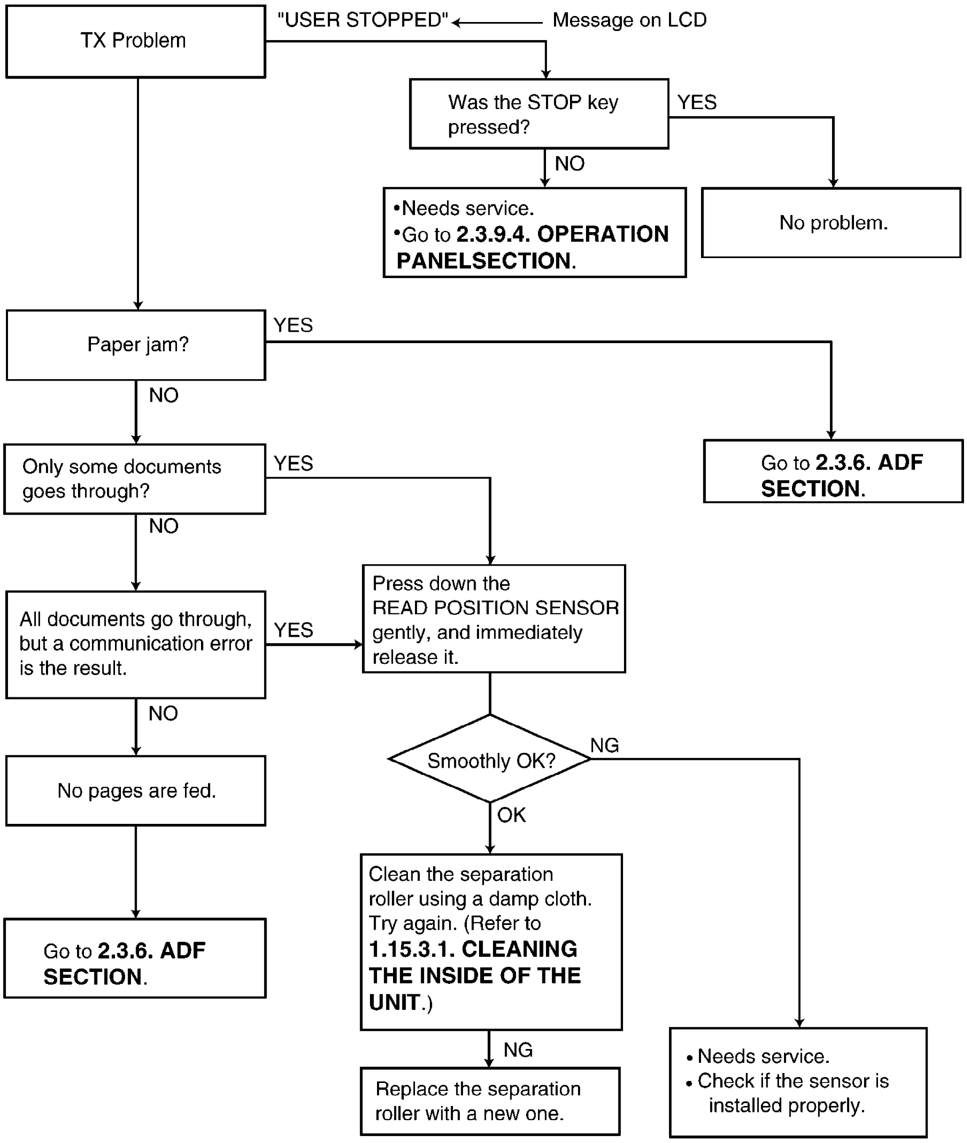
2.3.7. COMMUNICATION SECTION

Find the problem in the table shown below, and refer to the corresponding troubleshooting procedure in DEFECTIVE FACSIMILE SECTION ().

No.	Symptom	Content	Possible cause
1	The paper dose not feed properly when faxing. (Copying is also not possible.)	Troubleshooting	Problem with the feeding mechanism. (Refer to TRANSMIT PROBLEM ().)
2	The fax transmits successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the receiver's fax. (Refer to SOMETIME THERE IS A TRANSMIT PROBLEM ().)
3	The fax receives successfully one time and fails another. (Copying is also possible.)	Troubleshooting	Problem with the service line or with the transmitter's fax. (Refer to RECEIVE PROBLEM ().)
4	The fax completely fails to transmit or receive. (Copying is also possible.)	Troubleshooting	Problem with the electric circuit. (Refer to THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE ().)
5	The fax fails either to transmit or receive when making a long distance or an international call. (Copying is also possible.)	Detailed description of the possible causes (Similar to troubleshooting items No.2 and No.3.)	Problem with the service line. (Refer to THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE OR INTERNATIONL COMMUNICATIONS ().)
6	The fax image is poor when transmitting or receiving during a long distance or international call.		
7	No.1-No.5	The troubleshooting procedure for each error code will be printed on the communication result report.	(Refer to HOW TO OUTPUT THE JOURNAL REPORT ().)

2.3.7.1. DEFECTIVE FACSIMILE SECTION

2.3.7.1.1. TRANSMIT PROBLEM


TX Problem
"USER STOPPED"
Message on LCD
Was the STOP key pressed?
YES
NO
•Needs service.
•Go to 2.3.9.4. OPERATION PANELSECTION.
No problem.
Paper jam?
YES
NO
Go to 2.3.6. ADF SECTION.
Only some documents goes through?
YES
NO
Press down the READ POSITION SENSOR gently, and immediately release it.
All documents go through, but a communication error is the result.
YES
NO
Smoothly OK?
NG
OK
No pages are fed.
Clean the separation roller using a damp cloth. Try again. (Refer to 1.15.3.1. CLEANING THE INSIDE OF THE UNIT.)
Go to 2.3.6. ADF SECTION.
NG
Replace the separation roller with a new one.
• Needs service.
• Check if the sensor is installed properly.

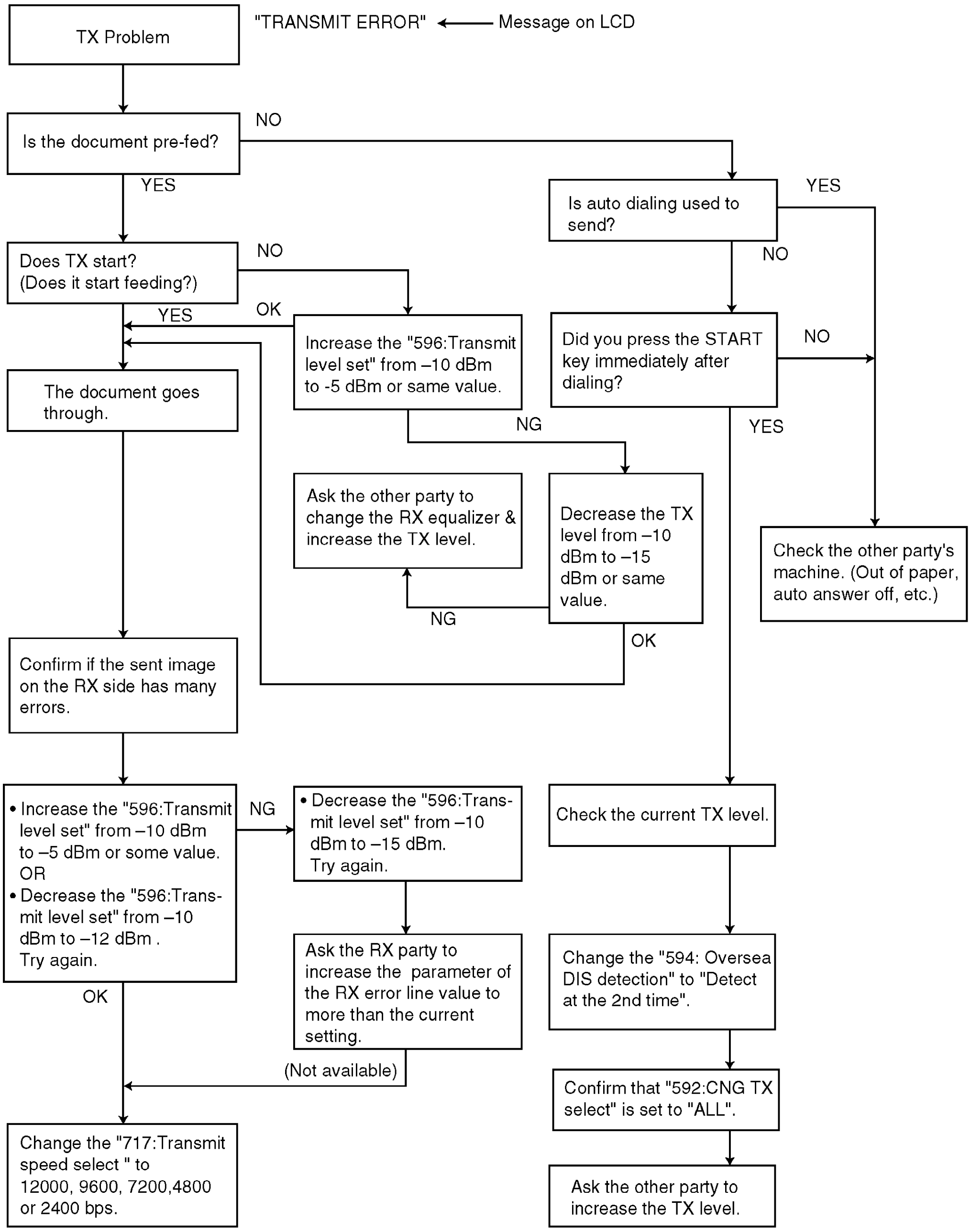
CROSS REFERENCE:

CLEANING THE INSIDE OF THE UNIT **()**

ADF(Auto document feed) SECTION **()**

OPERATION PANEL SECTION **()**

2.3.7.1.2. SOMETIME THERE IS A TRANSMIT PROBLEM


TX Problem
"TRANSMIT ERROR"
Message on LCD
Is the document pre-fed?
NO
YES
Is auto dialing used to send?
YES
NO
Does TX start? (Does it start feeding?)
NO
YES
OK
Increase the "596:Transmit level set" from –10 dBm to -5 dBm or same value.
Did you press the START key immediately after dialing?
NO
YES
The document goes through.
NG
Ask the other party to change the RX equalizer & increase the TX level.
Decrease the TX level from –10 dBm to –15 dBm or same value.
Check the other party's machine. (Out of paper, auto answer off, etc.)
NG
OK
Confirm if the sent image on the RX side has many errors.
• Increase the "596:Transmit level set" from –10 dBm to –5 dBm or some value.
OR
• Decrease the "596:Transmit level set" from –10 dBm to –12 dBm .
Try again.
NG
• Decrease the "596:Transmit level set" from –10 dBm to –15 dBm.
Try again.
Check the current TX level.
OK
Ask the RX party to increase the parameter of the RX error line value to more than the current setting.
Change the "594: Oversea DIS detection" to "Detect at the 2nd time".
(Not available)
Confirm that "592:CNG TX select" is set to "ALL".
Change the "717:Transmit speed select " to 12000, 9600, 7200,4800 or 2400 bps.
Ask the other party to increase the TX level.

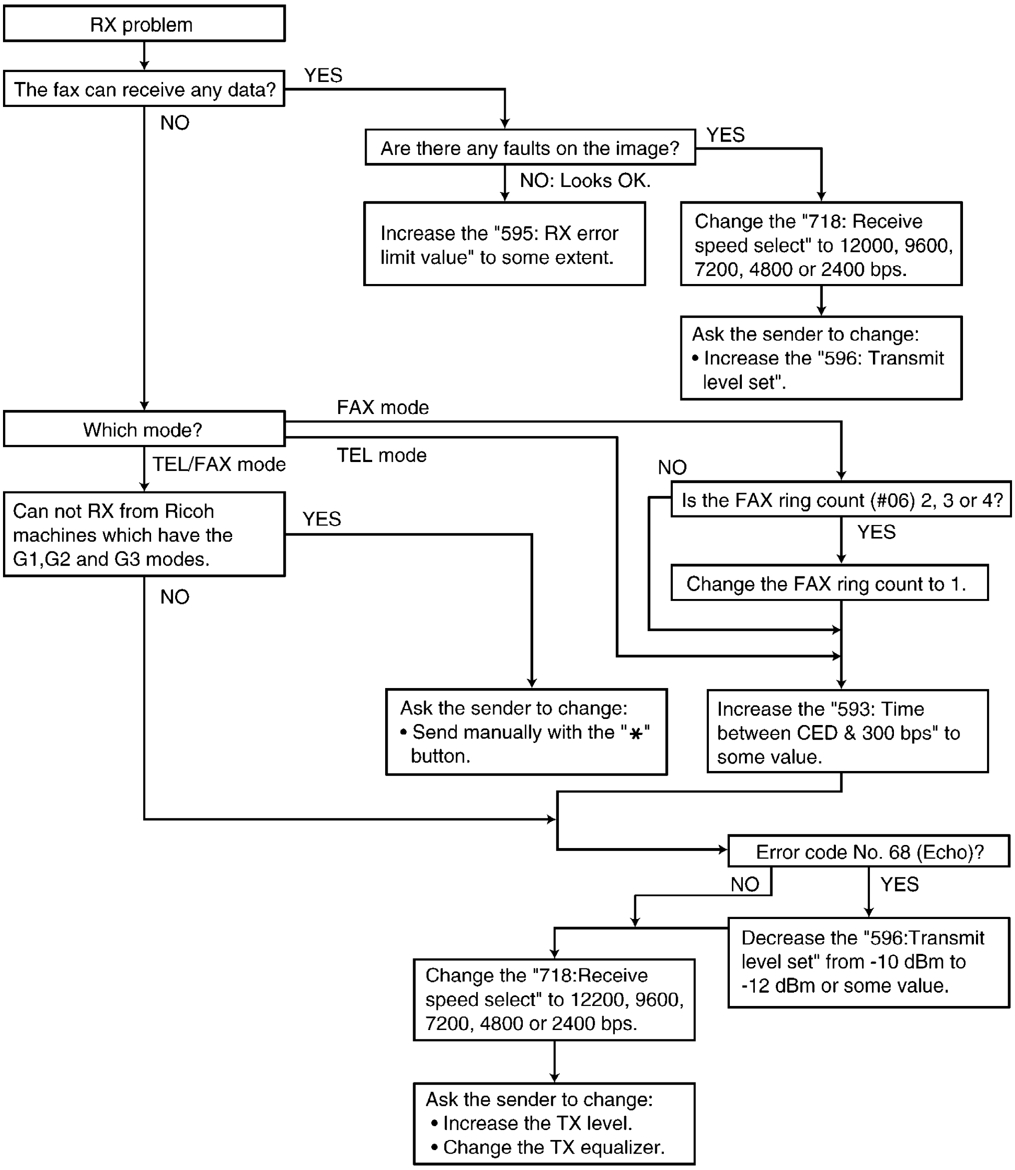
Note:

“596: Transmit level set” represents a service code. Refer to the SERVICE FUNCTION TABLE ().

2.3.7.1.3. RECEIVE PROBLEM

Confirm the following before starting troubleshooting.

- Is the recording paper installed properly? Refer to the next page.


RX problem
The fax can receive any data?
YES
NO
Are there any faults on the image?
YES
NO: Looks OK.
Increase the "595: RX error limit value" to some extent.
Change the "718: Receive speed select" to 12000, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the "596: Transmit level set".
Which mode?
FAX mode
TEL mode
TEL/FAX mode
NO
Is the FAX ring count (#06) 2, 3 or 4?
YES
Change the FAX ring count to 1.
Can not RX from Ricoh machines which have the G1,G2 and G3 modes.
YES
NO
Ask the sender to change:
• Send manually with the "∗" button.
Increase the "593: Time between CED & 300 bps" to some value.
Error code No. 68 (Echo)?
NO
YES
Decrease the "596:Transmit level set" from -10 dBm to -12 dBm or some value.
Change the "718:Receive speed select" to 12200, 9600, 7200, 4800 or 2400 bps.
Ask the sender to change:
• Increase the TX level.
• Change the TX equalizer.

Note:

"596: Transmit level set" represents a service code. Refer to the SERVICE FUNCTION TABLE ().

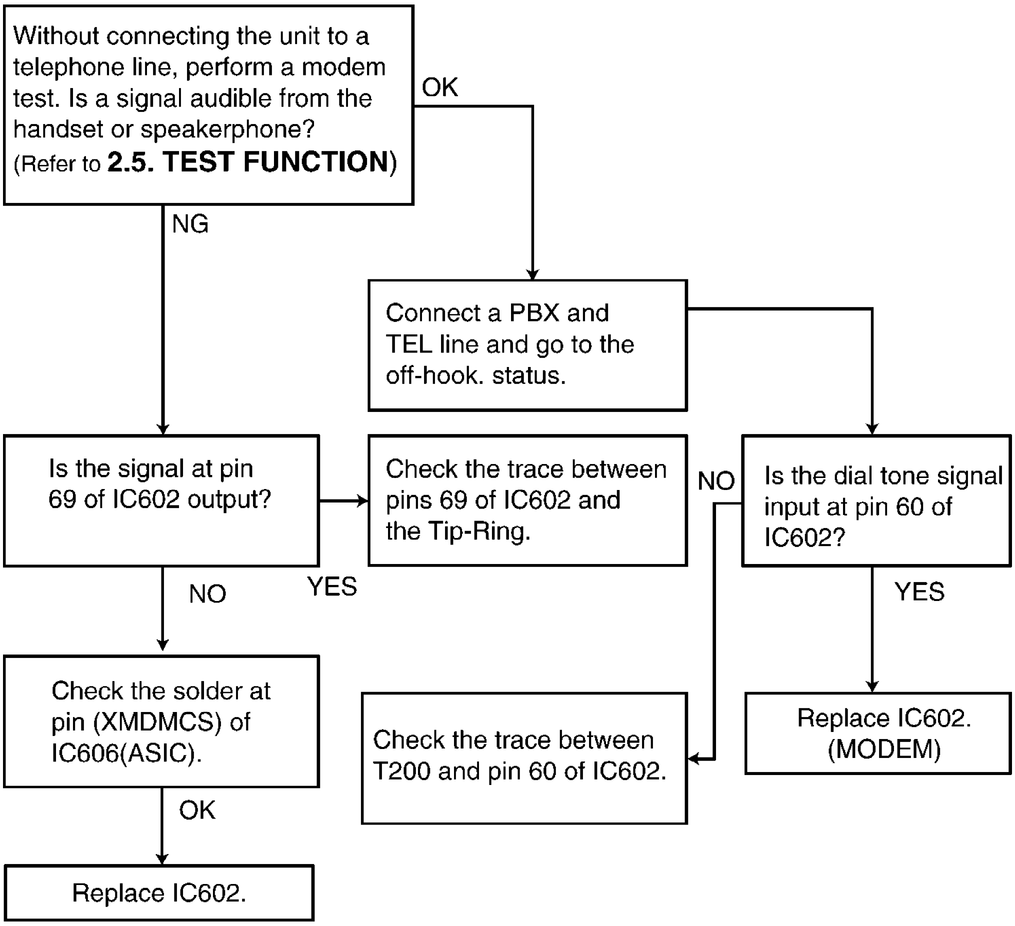
For the receiving problem, we have thought of causes other than in the software. Some causes may be when the fax changes to the memory receiving mode (for example, when out of paper). and the memory becomes full of the unprinted fax data. In this case, [MEMORY FULL] and its main cause (for example, "OUT OF PAPER") are displayed on the LCD. Accordingly, by solving the main problem, [MEMORY FULL] can be canceled and the receiving problem can solved. The causes of the display errors are shown below.

OUT OF PAPER
TONER LOW
TONER EMPTY
CALL SERVICE

COVER OPEN
FAILED PICK UP
PAPER JAMMED
CHECK DRUM
CHECK MEMORY
NO FAX REPLY
MODEM ERROR
MEMORY FULL
JOG-DIAL FULL
FAX MEMORY FULL
FAX IN MEMORY
REMOVE DOCUMENT
REDIAL TIME OUT
TRANSMIT ERROR

Please refer to USER RECOVERABLE ERRORS () for the above items. / Also, when it actually becomes a hardware deformity, please check each sensor.

2.3.7.1.4. THE UNIT CAN COPY, BUT CANNOT TRANSMIT/RECEIVE


Without connecting the unit to a telephone line, perform a modem test. Is a signal audible from the handset or speakerphone?
(Refer to 2.5. TEST FUNCTION)
OK
NG
Connect a PBX and TEL line and go to the off-hook. status.
Is the signal at pin 69 of IC602 output?
Check the trace between pins 69 of IC602 and the Tip-Ring.
NO
Is the dial tone signal input at pin 60 of IC602?
NO
YES
YES
Check the solder at pin (XMDMCS) of IC606(ASIC).
Check the trace between T200 and pin 60 of IC602.
Replace IC602. (MODEM)
OK
Replace IC602.

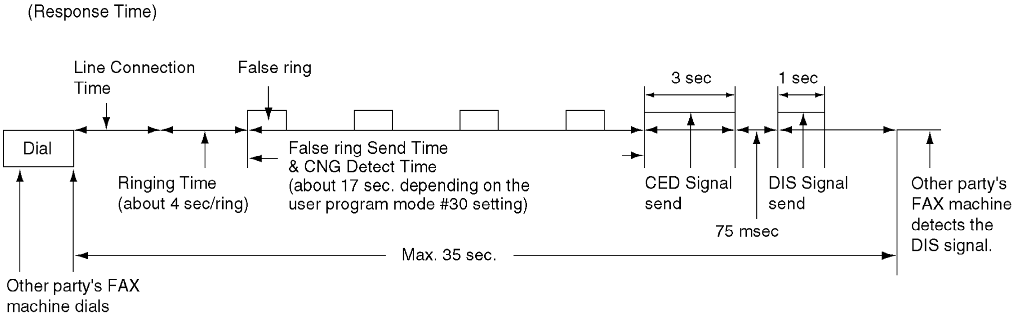
CROSS REFERENCE:
TEST FUNCTIONS ()

2.3.7.1.5. THE UNIT CAN COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATIONL COMMUNICATIONS

The following two causes can be considered for this symptom.

Cause 1:

The other party is executing automatic dialing, the call has been received by this unit, and the CED or DIS signal response time is too long. (In most cases, this unit detects the CNG signal and can respond to CED or DIS.) (According to the ITU-T standard, the communication procedure is cancelled when there is no response from the other party within 35 sec, so that the other party releases the line.)


(Response Time)
Line Connection Time
False ring
3 sec
1 sec
Dial
Ringing Time (about 4 sec/ring)
False ring Send Time & CNG Detect Time (about 17 sec. depending on the user program mode #30 setting)
CED Signal send
DIS Signal send
75 msec
Other party's FAX machine detects the DIS signal.
Max. 35 sec.
Other party's FAX machine dials

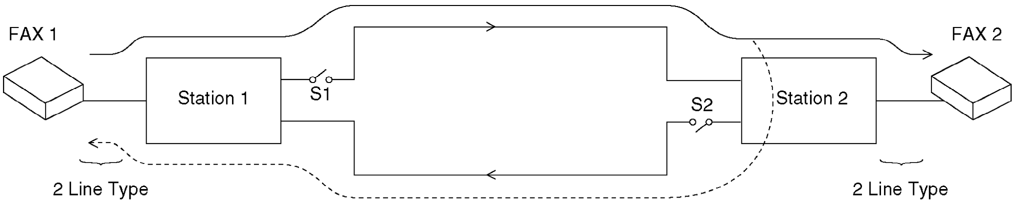
(Cause and Countermeasure)

As shown in the chart above, the total handshaking time must be reduced, but because of the long distance connection and linking of several stations, the line connection time cannot be reduced. Accordingly, the following countermeasures should be tried.

(A)... As the 35 sec. count is started directly after dialing or directly after the START button has been pressed for models with a START button, the other party should be called manually, if possible. Another possibility is entering two pauses at the end of the auto dial number on the transmission side. Then the count start time can be delayed for 2 pauses (about 10 sec.).

Cause 2:

Erroneous detection because of an echo or an echo canceler.


FAX 1
FAX 2
Station 1
Station 2
S1
S2
2 Line Type
2 Line Type

(Echo/Echo Canceler)

The signal from FAX1 reaches FAX2 via stations 1 and 2, but the reflection signal at station 2 also returns via station 1 (echo). As the distance between station 1 and station 2 is far, the echo returns to FAX 1 at a max of 600 msec after transmission. There is a possibility that this signal

is detected erroneously as the signal from FAX2. For a normal call, there is also a possibility that the echo of their own voice will make the call difficult to understand. For this reason, each station (station 1 and station 2) attaches echo cancelers (S1 and S2) for international lines or long distance lines. For the echo canceler, the level of the transmission signal from FAX 1 is compared with the level of the reception signal from FAX2. When the transmission signal is larger, S1 is closed while S2 is opened when it is smaller. In other words, for transmission from FAX1, S1 is closed and S2 is open, so that the echo does not return to FAX1.

(Causes and Countermeasures)

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
1	Sending side	Some time is needed to compare the level of the receiving and sending signals for the echo canceler. The header of the training signal lacks due to a switching delay to close S1.	Add a dummy signal to the beginning of the training signal.	Service co (Internatio sele This counte becomes t valu
2	Receiving side	The echo canceler function stops according to a CED signal frequency of 2100Hz (S1 and S2 are both ON), a DIS signal is returned as an echo, and a DCS signal from the sending side overlaps the DIS echo. Then the receiving side FAX cannot retrieve the DCS signal. (Refer to Fig. a)	Change to a 1100Hz CED signal frequency. (Refer to Fig. b)	Service co (CED fre sele
	Receiving side		Change the regular rime of 75 msec between the CED signal and DIS signal to 500 msec. This will give at least 250 msec to recover the echo canceler operation. (Refer to Fig. c)	Service co (Time betw and 30
	Sending side		The sending side FAX sends a DCS signal not after receiving the 1st DIS signal but after receiving the 2nd DIS signal. (Refer to Fig. d)	Service co (Overse detection

No.	Countermeasure Side	Echo Communication Problem Example	Countermeasure	Service
3	Sending side	Communication failure occurs in a long distance communication on the telephone line without an echo canceler. or	Decrease the transmission level from -10 dBm to -15 dBm and the echo level will decrease.	Service co (Transmit
4	Sending side Receiving side		Decrease the receiving sensitivity from -13 dBm to about -32 dBm so an echo signal will not received.	Service co (Receiving
5	Sending side Receiving side	There are some cases (e.g. Mobil comms.) which cause the collision of TX / RX signals due to the delay / echo and noise of the network / terminal. (Refer to Fig. e)	Set additional Pause time (Service mode: code No. 774) in between the original and its repeated signals, to prevent the collision of the signals at both end.	Service co (T4 ti

Fig. a (Overlapping the Echo of the DIS signal and DCS signal)

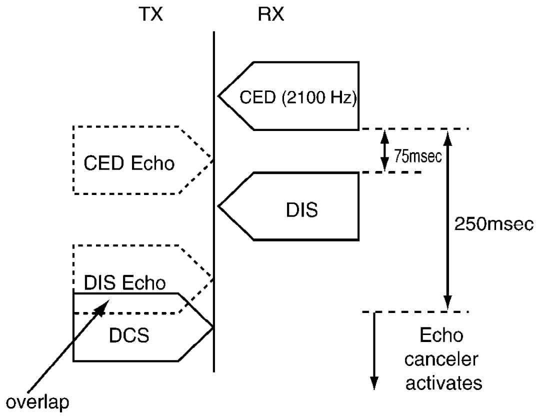

TX
RX
CED (2100 Hz)
CED Echo
75msec
DIS
250msec
DIS Echo
DCS
Echo
canceler
activates
overlap

Fig. b (Countermeasure by Changing the CED Frequency)

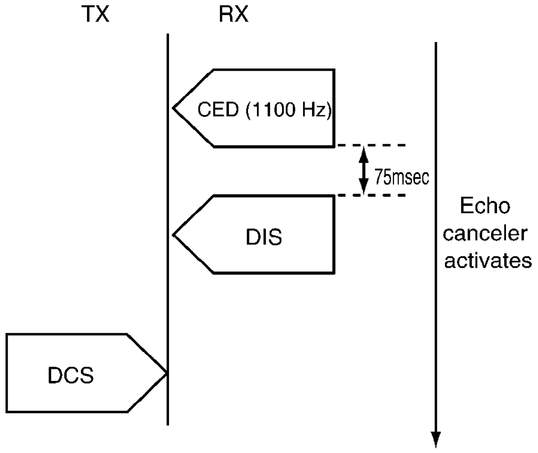

TX
RX
CED (1100 Hz)
75msec
DIS
Echo
canceler
activates
DCS

Fig. c (Countermeasure by Changing the Interval Between CED and DIS)

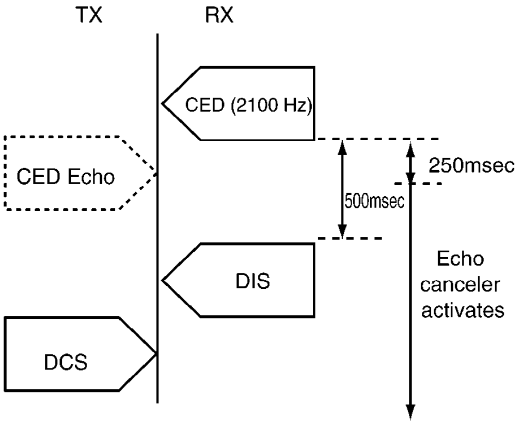
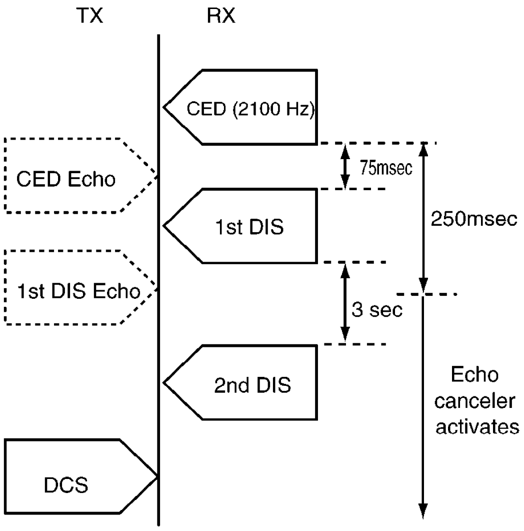
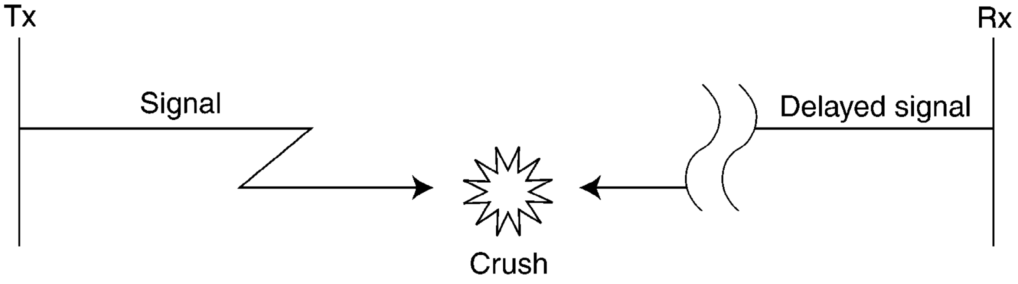

TX
RX
CED (2100 Hz)
CED Echo
250msec
500msec
DIS
Echo canceler activates
DCS

Fig. d (C3ountemeasure by Ignoring the 1st DIS)


TX
RX
CED (2100 Hz)
CED Echo
75msec
1st DIS
250msec
1st DIS Echo
3 sec
2nd DIS
Echo canceler activates
DCS

<TX side signal>	<RX side signal>	<Countermeasure>
2nd / 3rd DCS / Training	& delayed CFR / FTT	at TX side
2nd / 3rd EOP / EOM / MPS	& delayed MCF / PIP / PIN / RTP / RTN	at TX side
delayed DCS	& 2nd / 3rd / --- DIS	at RX side

(Fig. e)


Tx
Rx
Signal
Delayed signal
Crush

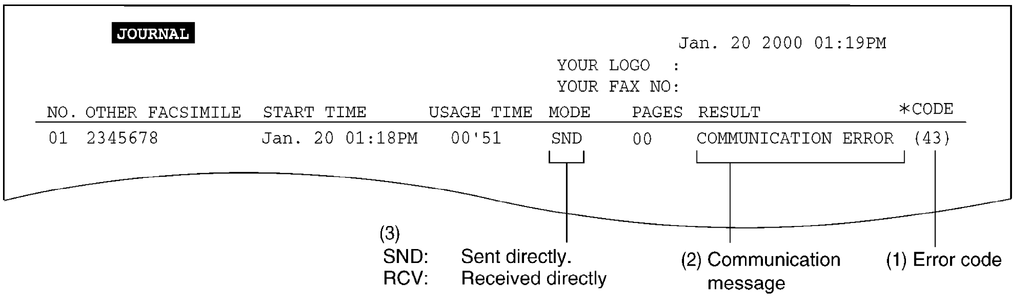
2.3.7.1.6. HOW TO OUTPUT THE JOURNAL REPORT

1. Press the MENU button.

2. Press "#", then " 8 " and " 3 ".

3. Press the START/COPY/SET button.

4. The report prints out.



```
        JOURNAL
                                                      Jan. 20 2000 01:19PM
                                          YOUR LOGO  :
                                          YOUR FAX NO:
 NO. OTHER FACSIMILE  START TIME      USAGE TIME  MODE    PAGES  RESULT                 *CODE
 01  2345678          Jan. 20 01:18PM    00'51     SND     00    COMMUNICATION ERROR  (43)
```

(3)
SND: Sent directly.
RCV: Received directly
(2) Communication message
(1) Error code

Error code table:

(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me
	PRESSED THE STOP KEY	SND & RCV	Communication was interrupted by the STOP button.	
	DOCUMENT JAMMED	SND	The document paper is jammed.	
	NO DOCUMENT	SND	No document paper.	
	THE COVER WAS OPENED	SND & RCV	The cover is open.	
40	COMMUNICATION ERROR	SND	Transmission is finished when the T1 TIMER expires.	
41	COMMUNICATION ERROR	SND	DCN is received after DCS transmission.	
42	COMMUNICATION ERROR	SND	FTT is received after transmission of a 2400BSP training signal.	
43	COMMUNICATION ERROR	SND	No response after post message is transmitted three times.	
44	COMMUNICATION ERROR	SND	RTN and PIN are received.	
46	COMMUNICATION ERROR	RCV	No response after FTT is transmitted.	
48	COMMUNICATION ERROR	RCV	No post message.	
49	COMMUNICATION ERROR	RCV	RTN is transmitted.	
50	COMMUNICATION ERROR	RCV	PIN is transmitted (to PRI-Q).	
51	COMMUNICATION ERROR	RCV	PIN is transmitted.	

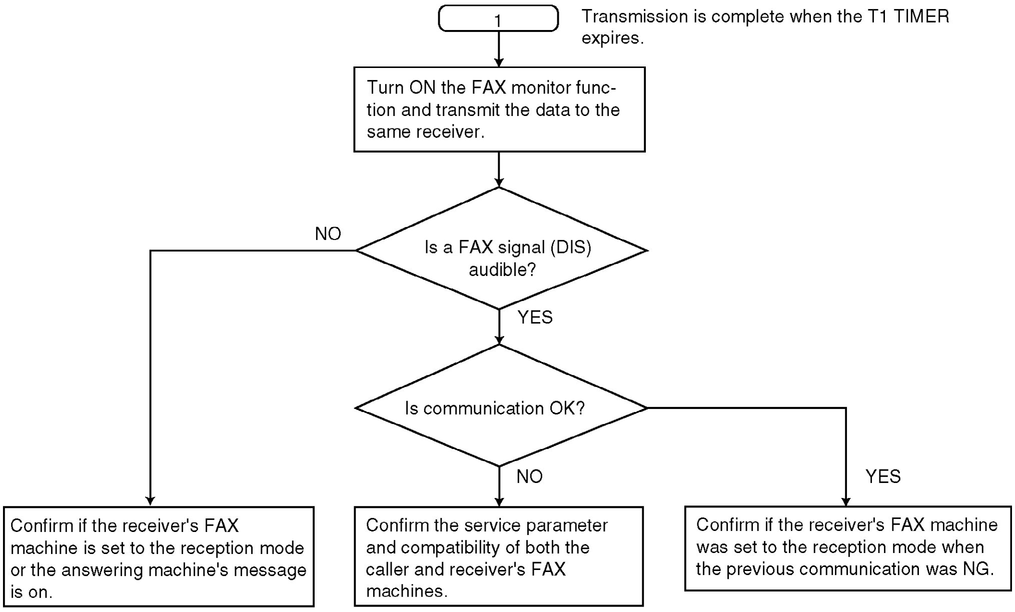
(1) CODE	(2) RESULT	(3) MODE	SYMPTOM	Co me
52	COMMUNICATION ERROR	RCV	Reception is finished when the T1 TIMER expires.	
54	ERROR-NOT YOUR UNIT	RCV	DCN is received after DIS transmission.	
58	COMMUNICATION ERROR	RCV	DCN is received after FTT transmission.	
59	ERROR-NOT YOUR UNIT	SND	DCN responds to the post message.	
65	COMMUNICATION ERROR	SND	DCN is received before DIS reception.	
65	COMMUNICATION ERROR	RCV	Reception is not EOP, EOM PIP, PIN, RTP or RTN.	
68	COMMUNICATION ERROR	RCV	No response at the other party after MCF or CFR is transmitted.	
70	ERROR-NOT YOUR UNIT	RCV	DCN is received after CFR transmission.	
72	COMMUNICATION ERROR	RCV	Carrier is cut when the image signal is received.	
75	MEMORY FULL	RCV	The document was not received due to memory full.	
79	CANCELED	SND	The multi-station transmission was rejected by the user.	
FF	COMMUNICATION ERROR	SND & RCV	Modem error. For the DCN, DCN, etc. abbreviations, refer to MODEM SECTION ().	

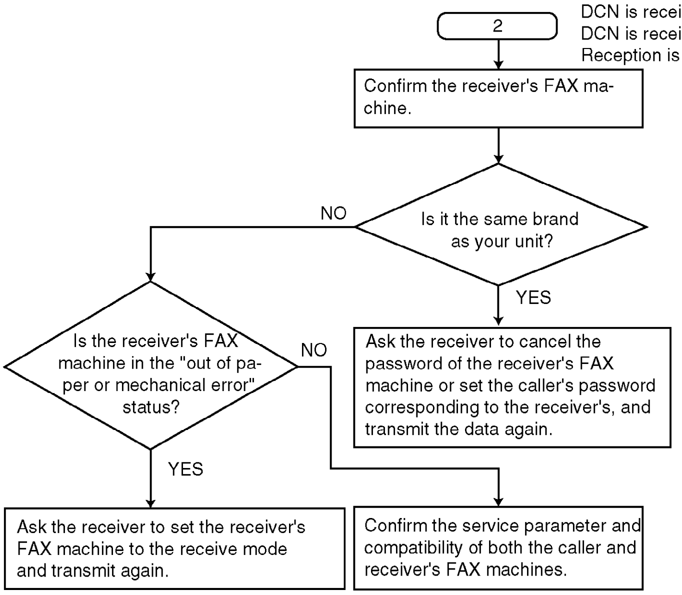
SND=TRANSMISSION / RCV=RECEPTION
Most fax communication problems can be resolved by the following steps.

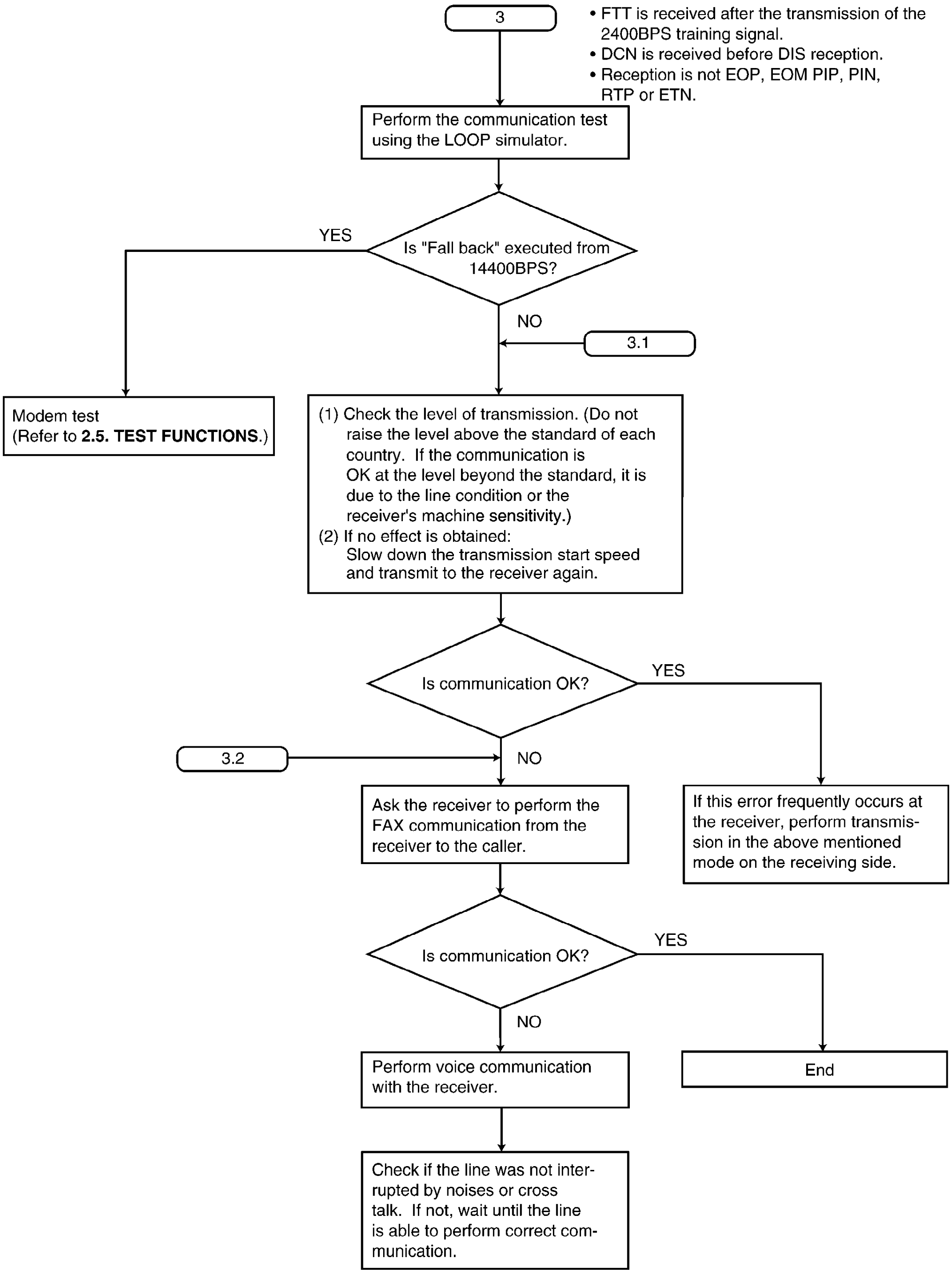
1. **Change the transmit level. (Service code: 596, refer to SERVICE FUNCTION TABLE().)**
2. **Change the TX speed/RX speed. (Service code: 717/718, refer to SERVICE FUNCTION TABLE ().)**

Note*:
If the problem remains, see the following "Countermeasure" flow chart.

Countermeasure

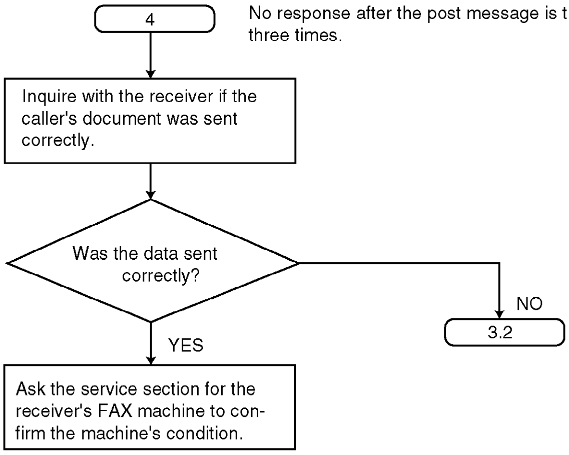

Transmission is complete when the T1 TIMER expires.
1
Turn ON the FAX monitor function and transmit the data to the same receiver.
Is a FAX signal (DIS) audible?
NO
YES
Is communication OK?
NO
YES
Confirm if the receiver's FAX machine is set to the reception mode or the answering machine's message is on.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.
Confirm if the receiver's FAX machine was set to the reception mode when the previous communication was NG.

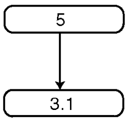

DCN is received after DCS transmission.
DCN is received after FTT transmission.
Reception is not EOP, EOM PIN, RTP or RTN.
2
Confirm the receiver's FAX machine.
Is it the same brand as your unit?
NO
YES
Ask the receiver to cancel the password of the receiver's FAX machine or set the caller's password corresponding to the receiver's, and transmit the data again.
Is the receiver's FAX machine in the "out of paper or mechanical error" status?
NO
YES
Ask the receiver to set the receiver's FAX machine to the receive mode and transmit again.
Confirm the service parameter and compatibility of both the caller and receiver's FAX machines.

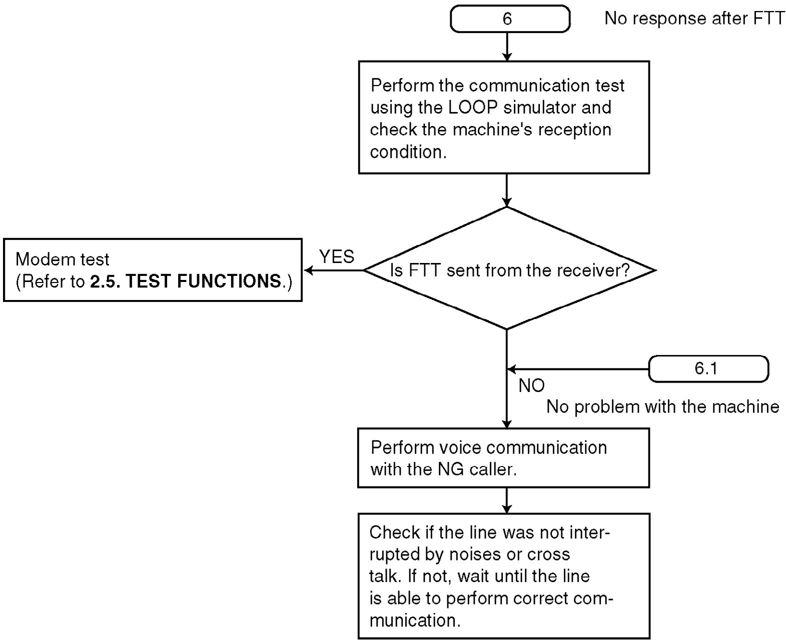

3
• FTT is received after the transmission of the 2400BPS training signal.
• DCN is received before DIS reception.
• Reception is not EOP, EOM PIP, PIN, RTP or ETN.
Perform the communication test using the LOOP simulator.
Is "Fall back" executed from 14400BPS?
YES
NO
3.1
Modem test (Refer to 2.5. TEST FUNCTIONS.)
(1) Check the level of transmission. (Do not raise the level above the standard of each country. If the communication is OK at the level beyond the standard, it is due to the line condition or the receiver's machine sensitivity.)
(2) If no effect is obtained: Slow down the transmission start speed and transmit to the receiver again.
Is communication OK?
YES
NO
3.2
Ask the receiver to perform the FAX communication from the receiver to the caller.
If this error frequently occurs at the receiver, perform transmission in the above mentioned mode on the receiving side.
Is communication OK?
YES
NO
Perform voice communication with the receiver.
End
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

CROSS REFERENCE:

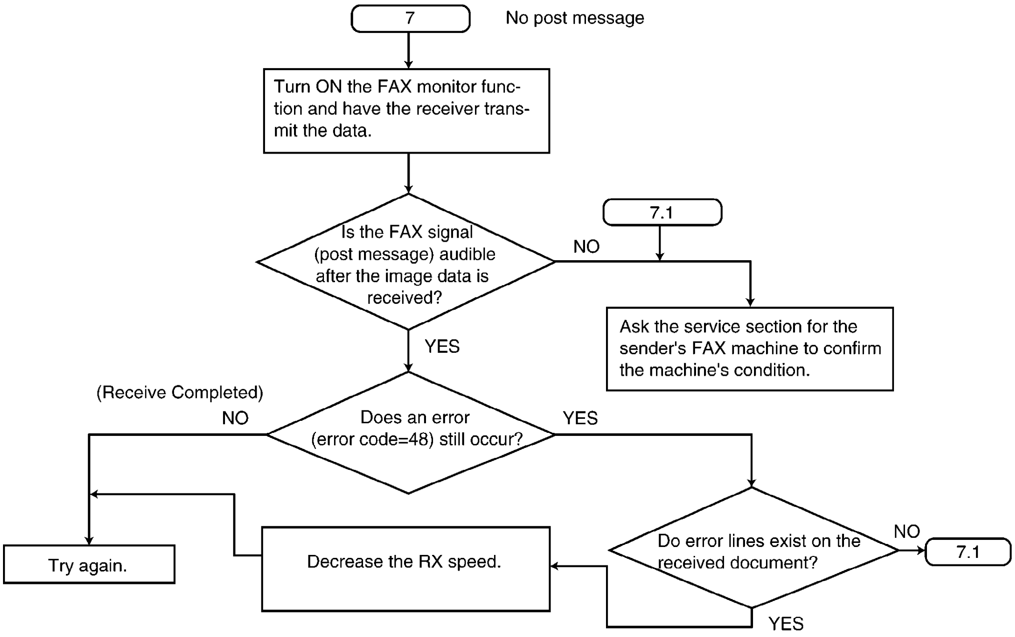
TEST FUNCTIONS ()

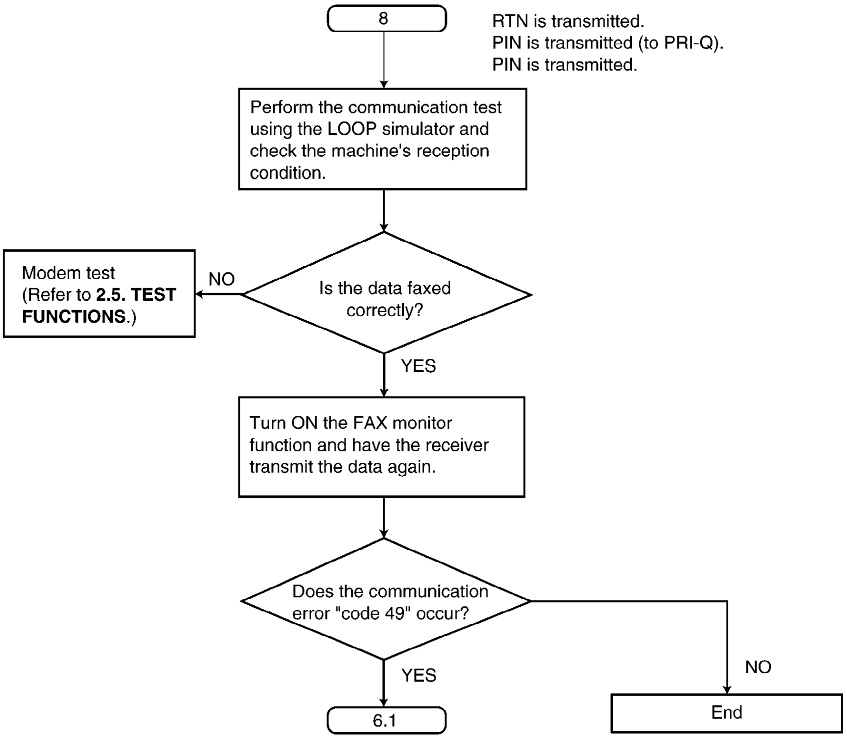

4
No response after the post message is transmitted three times.
Inquire with the receiver if the caller's document was sent correctly.
Was the data sent correctly?
NO
3.2
YES
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


5
RTN and PIN are received.
3.1


6
No response after FTT is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is FTT sent from the receiver?
YES
Modem test
(Refer to **2.5. TEST FUNCTIONS**.)
6.1
NO
No problem with the machine hardware.
Perform voice communication with the NG caller.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line is able to perform correct communication.

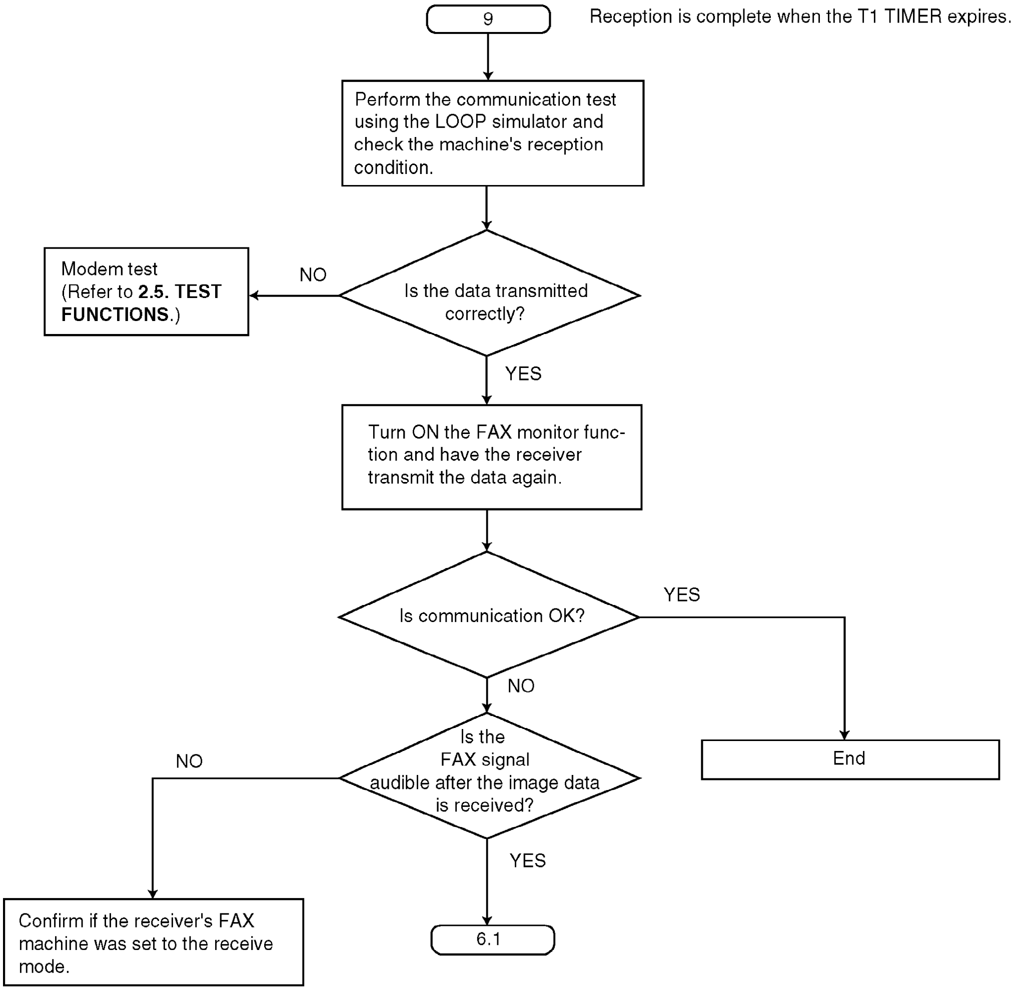
CROSS REFERENCE:
TEST FUNCTIONS ()


7
No post message
Turn ON the FAX monitor function and have the receiver transmit the data.
Is the FAX signal (post message) audible after the image data is received?
NO
7.1
Ask the service section for the sender's FAX machine to confirm the machine's condition.
YES
(Receive Completed)
NO
Does an error (error code=48) still occur?
YES
Try again.
Decrease the RX speed.
Do error lines exist on the received document?
NO
7.1
YES


8
RTN is transmitted.
PIN is transmitted (to PRI-Q).
PIN is transmitted.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Modem test (Refer to 2.5. TEST FUNCTIONS.)
NO
Is the data faxed correctly?
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Does the communication error "code 49" occur?
YES
6.1
NO
End

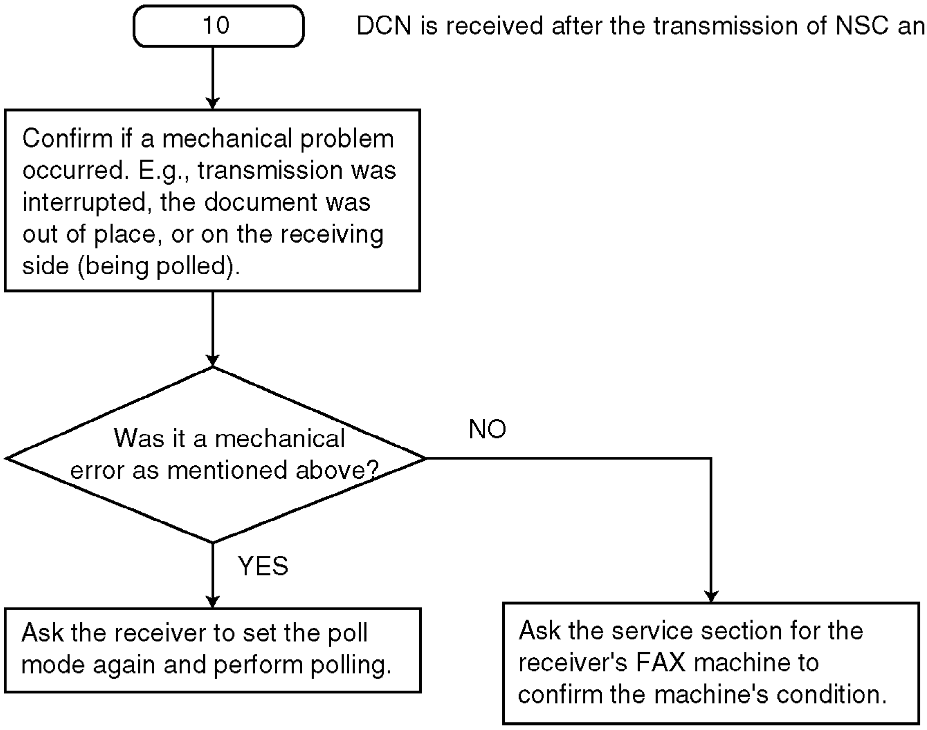
CROSS REFERENCE:

TEST FUNCTIONS ()

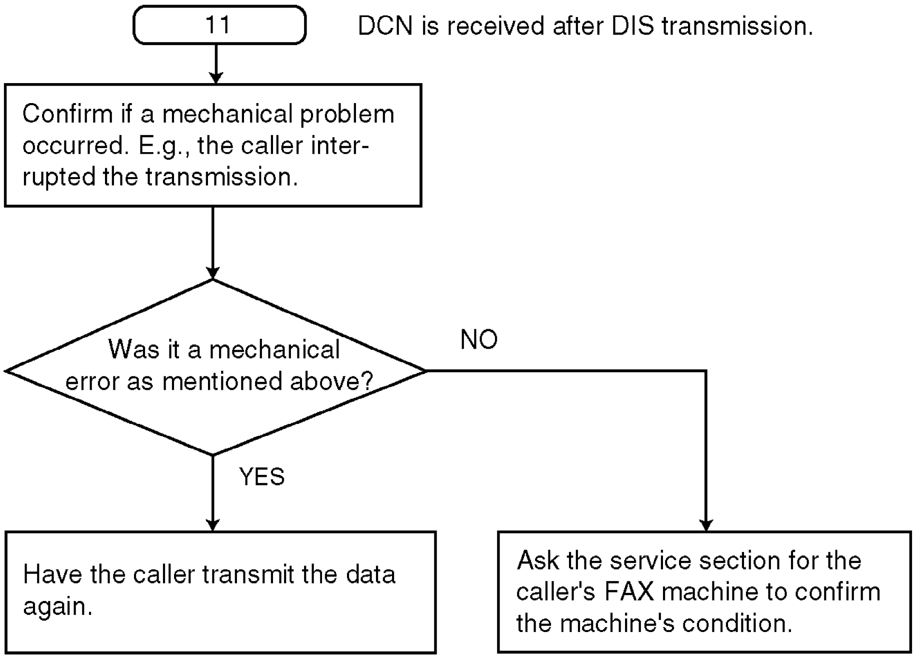

9
Reception is complete when the T1 TIMER expires.
Perform the communication test using the LOOP simulator and check the machine's reception condition.
Is the data transmitted correctly?
NO
Modem test (Refer to **2.5. TEST FUNCTIONS**.)
YES
Turn ON the FAX monitor function and have the receiver transmit the data again.
Is communication OK?
YES
End
NO
Is the FAX signal audible after the image data is received?
NO
Confirm if the receiver's FAX machine was set to the receive mode.
YES
6.1

CROSS REFERENCE:

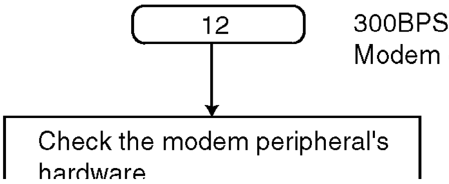
TEST FUNCTIONS ()


10
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.

DCN is received after the transmission of NSC and DTC.


11
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Have the caller transmit the data again.
Ask the service section for the caller's FAX machine to confirm the machine's condition.

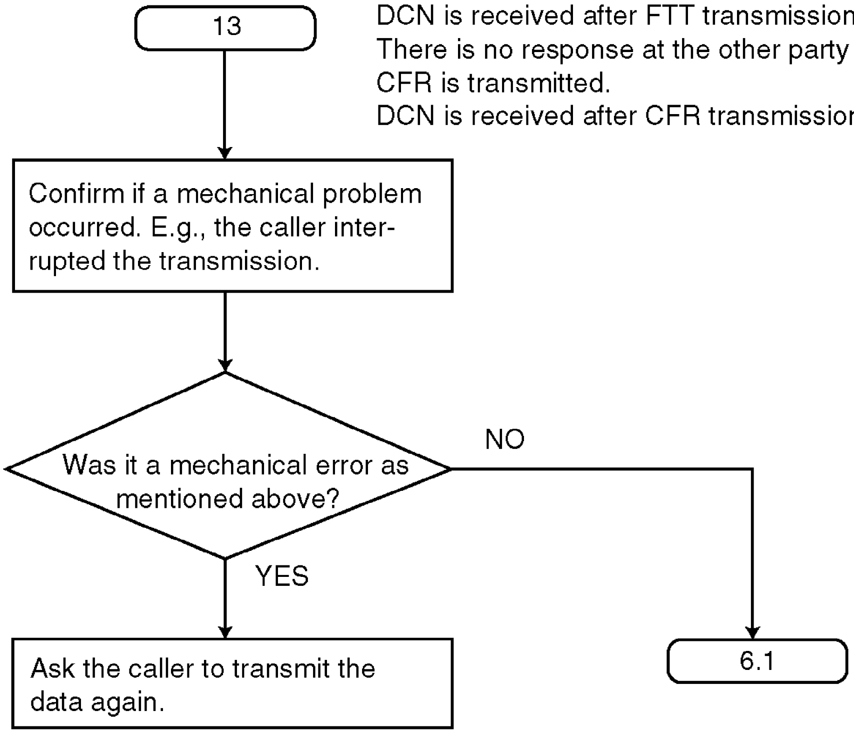
DCN is received after DIS transmission.


12
Check the modem peripheral's hardware

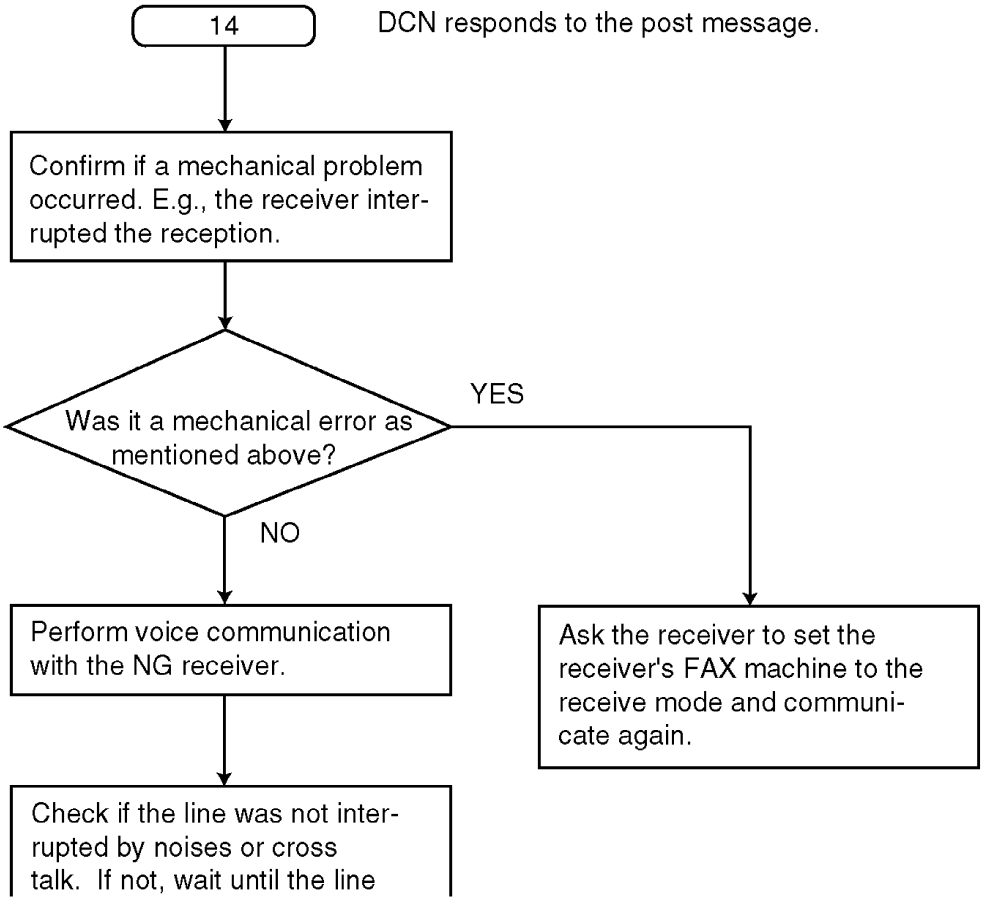
300BPS error
Modem error

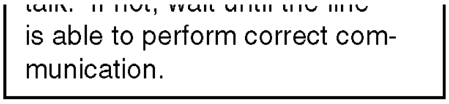
hardware.

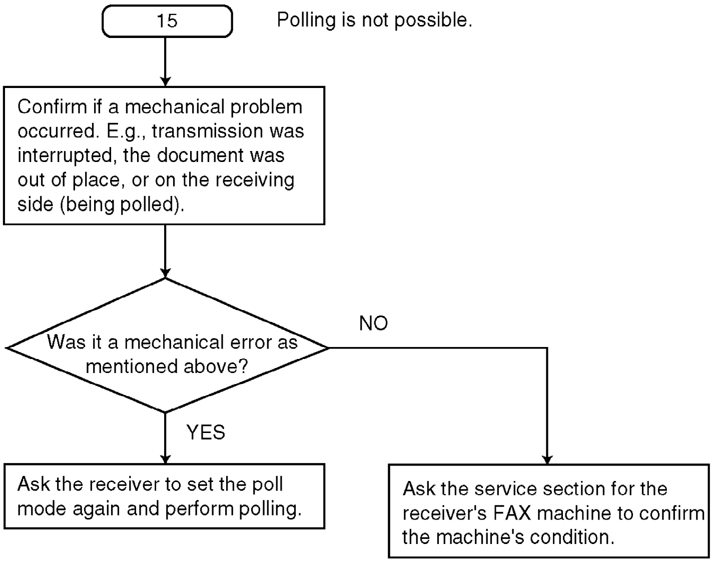
DCN is received after FTT transmission.
There is no response at the other party after MCF or CFR is transmitted.
DCN is received after CFR transmission.

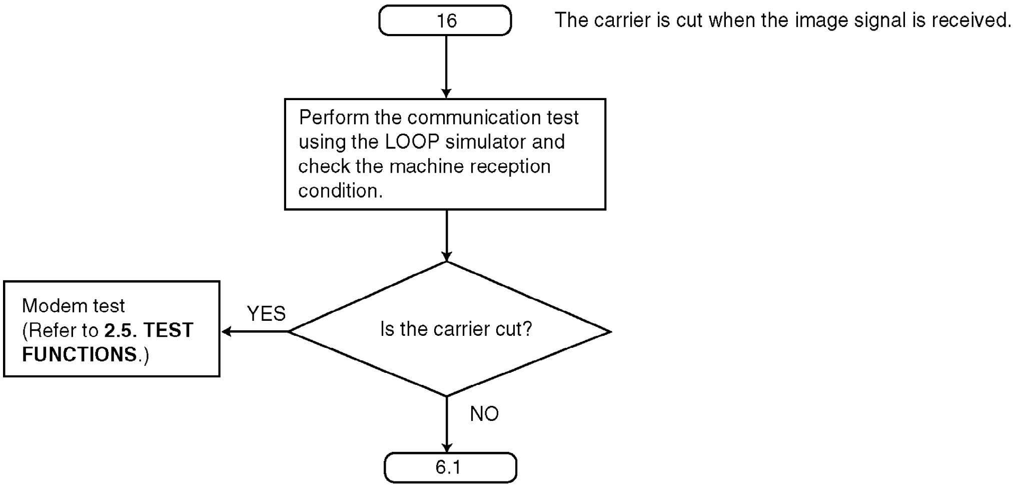

13
Confirm if a mechanical problem occurred. E.g., the caller interrupted the transmission.
Was it a mechanical error as mentioned above?
NO
YES
Ask the caller to transmit the data again.
6.1

DCN responds to the post message.


14
Confirm if a mechanical problem occurred. E.g., the receiver interrupted the reception.
Was it a mechanical error as mentioned above?
YES
NO
Perform voice communication with the NG receiver.
Ask the receiver to set the receiver's FAX machine to the receive mode and communicate again.
Check if the line was not interrupted by noises or cross talk. If not, wait until the line


is able to perform correct communication.


15
Polling is not possible.
Confirm if a mechanical problem occurred. E.g., transmission was interrupted, the document was out of place, or on the receiving side (being polled).
Was it a mechanical error as mentioned above?
NO
YES
Ask the receiver to set the poll mode again and perform polling.
Ask the service section for the receiver's FAX machine to confirm the machine's condition.


16
The carrier is cut when the image signal is received.
Perform the communication test using the LOOP simulator and check the machine reception condition.
Is the carrier cut?
YES
Modem test
(Refer to 2.5. TEST FUNCTIONS.)
NO
6.1

CROSS REFERENCE:

TEST FUNCTIONS ()

2.3.7.2. REMOTE PROGRAMMING

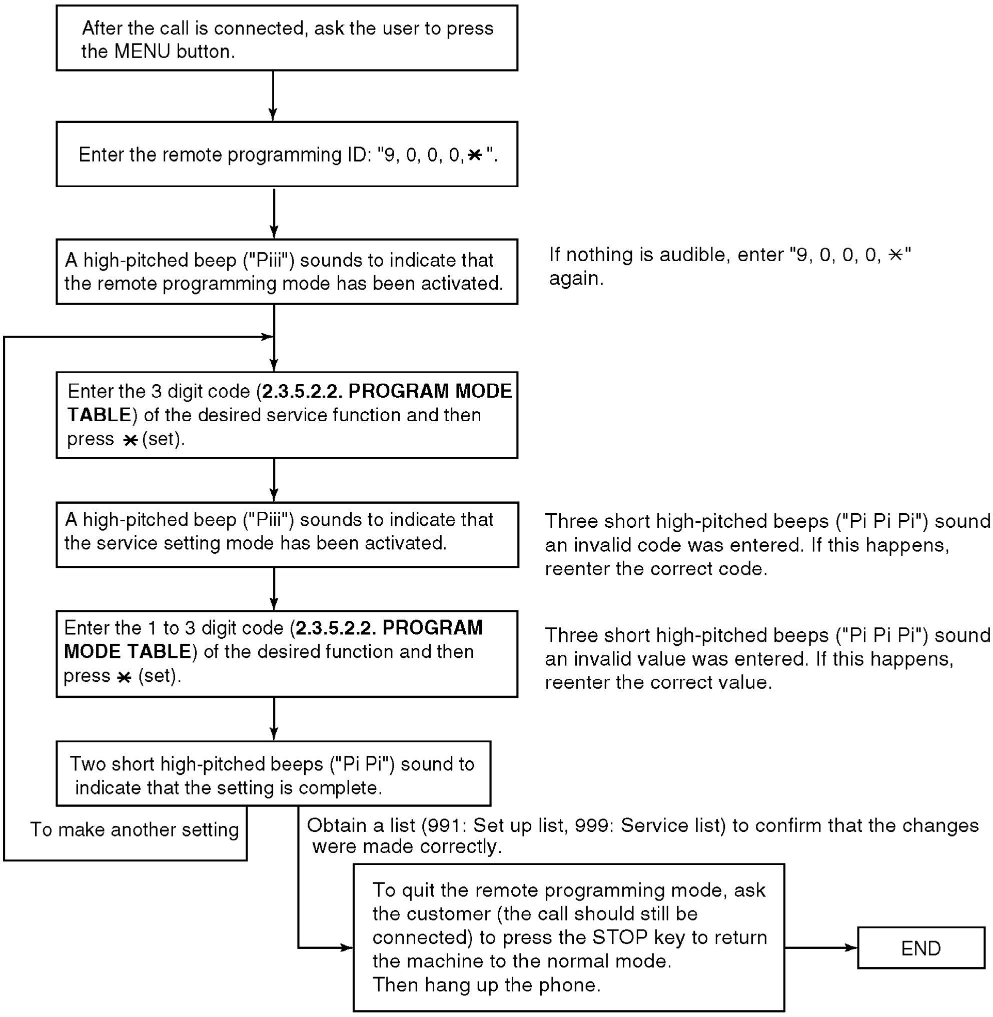
If, after the call is connected, the customer describes the situation and it is determined that the problem can be corrected by making parameter changes, this function makes it possible to change parameters such as the user code and service code from another fax (using DTMF tones). Therefore, travel to the customer's location is not required. However, it is not possible to change all the parameters remotely (PROGRAM MODE TABLE()). The function used to accomplish this is remote programming.

First, in order to check the current status of the service code parameter, print out the setup list

**(code: 991) and the service list (code: 999) from the customer's fax machine.
Based on this, the parameters for the desired codes can be changed.
The procedure for changing and listing parameters is described on ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES(). Also, before exiting the remote programming mode, it is advisable to obtain a new list to confirm that the changes were made correctly.**

**Hint:
Since the connected telephone is in use during the remote programming mode, it may be helpful to ask the customer to switch to the speakerphone. This frees the customer from the need to remain right next to the fax while you are making parameter settings. When finished, inform the customer. Also note that in very noisy locations where the DTMF tones are not audible, the remote programming function will not work.**

2.3.7.2.1. ENTERING THE REMOTE PROGRAMMING MODE AND CHANGING SERVICE CODES


After the call is connected, ask the user to press the MENU button.
Enter the remote programming ID: "9, 0, 0, 0, ✱".
A high-pitched beep ("Piii") sounds to indicate that the remote programming mode has been activated.
If nothing is audible, enter "9, 0, 0, 0, ✱" again.
Enter the 3 digit code (2.3.5.2.2. PROGRAM MODE TABLE) of the desired service function and then press ✱ (set).
A high-pitched beep ("Piii") sounds to indicate that the service setting mode has been activated.
Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid code was entered. If this happens, reenter the correct code.
Enter the 1 to 3 digit code (2.3.5.2.2. PROGRAM MODE TABLE) of the desired function and then press ✱ (set).
Three short high-pitched beeps ("Pi Pi Pi") sound if an invalid value was entered. If this happens, reenter the correct value.
Two short high-pitched beeps ("Pi Pi") sound to indicate that the setting is complete.
To make another setting
Obtain a list (991: Set up list, 999: Service list) to confirm that the changes were made correctly.
To quit the remote programming mode, ask the customer (the call should still be connected) to press the STOP key to return the machine to the normal mode. Then hang up the phone.
END

CROSS REFERENCE:

PROGRAM MODE TABLE ()

2.3.7.2.2. PROGRAM MODE TABLE

Code	Function	Set Value	Default	Remote Setting
001	Set date and time	mm/dd/yy hh:mm	Jan/01/00	NG
002	Your logo	---------	None	NG
003	Your fax telphone number	---------	None	NG
004	Transmission report mode	1:Error / 2:ON / 3:OFF	Error	OK
006	FAX ring count	1 to 5 rings (for ext. tam)	3	OK
012	Remote TAM activation	ON/ID=11 / OFF	OFF	NG
013	Dialing mode	1:Tone / 2:Pulse	Tone	OK
015	PC INTERACE	1:PARALLEL / 2:USB	PARALLEL	NG
016	Paper size	1:LETTER / 2:A4 / 3:LEGAL	LETTER	NG
017	Melody Ringer	1:A / 2:B / 3:C	A	NG
022	Auto journal print	1:ON / 2:OFF	ON	OK
023	Overseas mode	NEXT FAX / ERROR / OFF	ERROR	OK
025	Delayed transmission	ON / OFF	OFF	NG
026	Auto CALLER ID list	1:ON / 2:OFF	ON	OK
031	Distinctive ring	1:OFF / 2:A / 3:B / 4:C / 5:D	B	OK
037	Auto REDUCTION	1:ON / 2:OFF	ON	OK
039	LCD contrast	1:Normal / 2:Darker	Normal	NG
041	Remote FAX activation code	1:ON / 2:OFF	ON CODE=*9	NG
044	Receive alert	1:ON / 2:OFF	ON	OK
068	ECM Selection	1: ON / 2: OFF	ON	OK
076	FAX tone	1:ON / 2:OFF	ON	OK
079	Toner save	1:ON / 2:OFF	OFF	OK
080	Set default	YES / NO	NO	NG
501	Pause time set	001~600 x 100msec	030	OK
502	Flash time	01~99 x 10ms	70	OK
503	Dial speed	1:10pps / 2:20 pps	10pps	OK
520	CED frequency select	1:2100Hz / 2:1100Hz	2100	OK
521	International mode select	1:ON / 2:OFF	ON	OK
522	Auto standby select	1:ON / 2:OFF	ON	OK
523	Receive equalizer select	1 :0kms / 2:1.8km / 3:3.6km / 4:7.2km	0 km	OK
524	Transmission equalizer select	1 :0kms / 2:1.8km / 3:3.6km / 4:7.2km	0 km	OK
550	Memory clear	---------	---------	NG
551	ROM check	---------	---------	NG
552	DTMF signal tone test	1:ON / 2:OFF	OFF	OK
553	Monitor on FAX communication	1:OFF / 2:Phase B / 3:ALL	OFF	OK
554	Modem test	---------	---------	NG
555	Scanner test	---------	---------	NG
556	Motor test	---------	---------	NG
557	LED test	---------	---------	NG
558	LCD test	---------	---------	NG
561	Key test	---------	---------	NG

Code	Function	Set Value	Default	Remote Setting
570	Break % select	1:61% / 2:67%	61%	OK
573	Remote turn-on ring number	01~99	10	OK
590	FAX auto redial time set	00~99	02	OK
591	FAX auto redial line disconnection time set	001~999sec	065	OK
592	CNG transmit select	1:OFF / 2:ALL / 3:AUTO	ALL	OK
593	Time between CED and 300bps	1:75ms / 2:500ms / 3:1sec	75ms	OK
594	Overseas DIS detection select	1:1st / 2:2nd	1st	OK
595	Receive error limit value set	1:5% / 2:10% / 3:15% / 4:20%	10%	OK
596	Transmit level set	-15~00dBm	10	OK
598	Receiving Sensitivity	00~48	43	OK
599	ECM Frame size	1:256 / 2:64	256byte	OK
717	Transmit speed select	1:14400/2:12000/3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
718	Receive speed select	1:14400/2:12000/3:9600/ 4:7200/ 5:4800/ 6:2400	14400bps	OK
771	T1 timer	1:35s / 2:60s	35s	OK
774	T4 timer	00~99 × 100msec	00	OK
815	Sensor & VOX test	---------	---------	NG
852	Print test pattern	---------	---------	NG
853	Top margin	1~5	3	OK
854	Left margin	1~7	4	OK
880	History list	1:Start	---------	NG
881	Journal 2	---------	---------	NG
882	Journal 3	---------	---------	NG
991	Setup list	1:Start	---------	OK
994	Journal list	1:Start	---------	OK
995	Journal 2 list	1:Start	---------	OK
996	Journal 3 list	1:Start	---------	OK
998	History list	1:Start	---------	OK
999	Service list	1:Start	---------	OK

OK means "can set".
NG means "can not set".

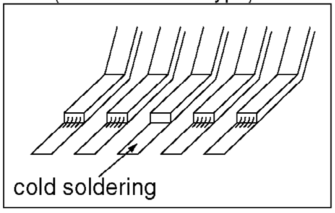
Note:
Refer to SERVICE FUNCTION TABLE () for descriptions of the individual codes.

Example:
If you want to set value in the "004 Transmission report mode", press the dial key number 1, 2 or 3 corresponding to the Set Value you want to select. (1:ERROR/2:ON/3:OFF)

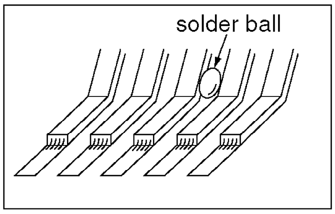
2.3.8. DIGITAL BOARD SECTION

When the unit fails to boot up the system, take the troubleshooting procedures very carefully. It may have a serious problem.
The symptom: No response when the power is turned on. (No LCD display, and keys are not accepted.)
The first step is to check the power source. If there is no problem with the power supply unit, the problem may lie in the digital unit (main board).
As there are many potential causes in this case (ASIC, DRAM, etc.), it may be difficult to specify what you should check first. If a mistake is made in the order of checks, a normal part may be determined faulty, wasting both time and money.
Although the tendency is to regard the problem as a serious one (IC malfunction, etc.), usually most cases are caused by solder faults (poor contact due to a tunnel in the solder, signal short circuit due to solder waste).

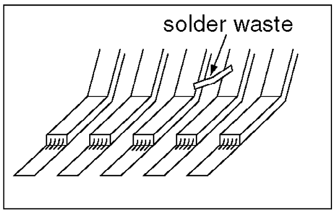
SMT(Surface Mount Type) PARTS



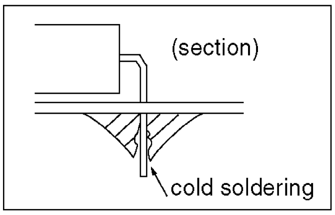
SMT PARTS



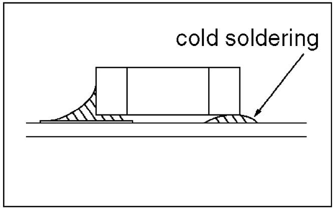
SMT PARTS



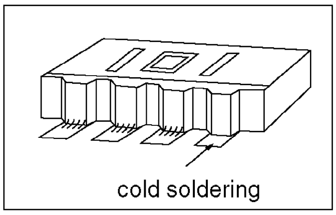
LEADED PARTS



CHIP PARTS (section)



RESISTOR ARRAY



Note:

1. **Electrical continuity may have existed at the factory check, but a faulty contact occurred as a result of vibration, etc., during transport.**
2. **Solder waste remaining on the board may get caught under the IC during transport, causing a short circuit.**

Before we begin mass production, several hundred trial units are produced at the plant, various tests are applied and any malfunctions are analyzed. (In past experiences, digital IC (especially, DRAM and ROM) malfunctions are extremely rare after installation in the product.)
This may be repaired by replacing the IC, (DRAM etc.). However, the real cause may not have been an IC malfunction but a soldering fault instead.
Soldering faults difficult to detect with the naked eye are common, particularly for ASIC and RA (Resistor Array). But if you have an oscilloscope, you can easily determine the problem site or IC malfunction by checking the main signal lines.
Even if you don't have such a measuring instrument, by checking each main signal line and

resoldering it, in many cases the problem will be resolved.
An explanation of the main signals (for booting up the unit) is presented below.

> Don't replace ICs or stop repairing until checking the signal lines.
> An IC malfunction rarely occurs. (By understanding the necessary signals for booting up the unit, the "Not Boot up" display is not a serious problem.)

What are the main signals for booting up the unit?
Please refer to DIGITAL BLOCK DIAGRAM ().
The ASIC (IC604) controls all the other digital ICs. When the power is turned on, the ASIC retrieves the operation code stored in the ROM (IC606), then follows the instructions for controlling each IC. All ICs have some inner registers that are assigned to a certain address.
It is the address bus by which the ASIC designates the location inside each IC. And the data bus reads or writes the data in order to transmit the instructions from the ASIC to the ICs.
These signal lines are all controlled by voltages of 3.3V (H) or 0V (L).

2.3.8.1. DIGITAL BLOCK DIAGRAM

The signal lines that must be normal for the system to boot up are listed here [List 1].
For signal lines other than these, even if they malfunction, they do not directly affect booting up the system.

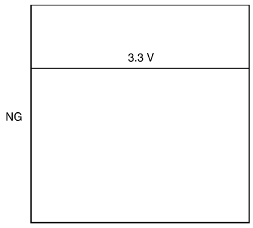
[List 1]

① D0~D15	(Data Bus)
② A0~A21,SA4~9,SA12~13	(Address Bus)
③ $\overline{\text{RD}}$	(Read Signal)
$\overline{\text{ROMCS}}$	(ROM Select Signal)
$\overline{\text{WR}}$	(Write Signal)
④ SRAS	(SDRAM Row Address Strobe Signal)
SCAS	(SDRAM Column Address Strobe Signal)
SWE	(SDRAM Write/Read Signal)
SCLK	(SDRAM Clock)
SDQML	(SDRAM Lower Data Mask Signal)
SDQMU	(SDRAM Upper Data Mask Signal)
SCLKE	(SDRAM Clock Erable)

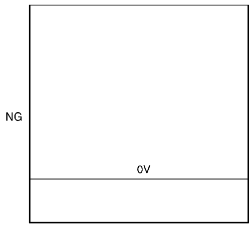
If these signals are in the normal condition, once the power is turned on, each IC repeatedly output 3.3 V(H) and 0 V(L). The following page shows NG and normal wave patterns.

NG Wave Pattern

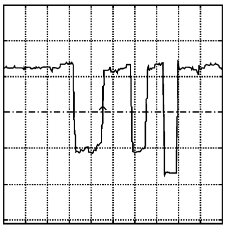
0 V never appears.



3.3 V never appears.

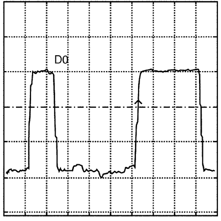


Short between D0 and D1
500 ns/div, 1 V/div

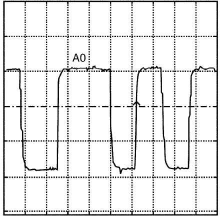


Normal Wave Patterns

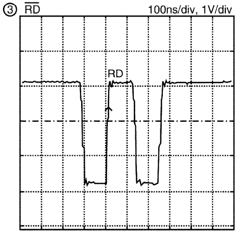
① D0~D15 25ns/div, 1V/div



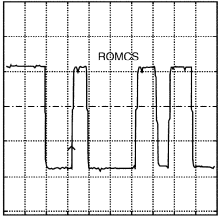
② A0~A12 25ns/div, 1V/div



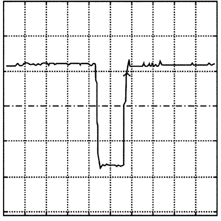
③ $\overline{RD}$ 100ns/div, 1V/div



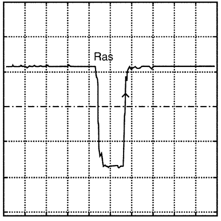
③ $\overline{ROMCS}$ 100ns/div, 1V/div



③ $\overline{G/A\ CS}$ 100ns/div, 1V/div



⑤ $\overline{RAS}$, $\overline{CAS}$ 25ns/div, 1V/div



Remarks:

For these reasons and the software sequence to boot up the unit, if you use an oscilloscope the judge whether a signal is OK or NG, you must check in the same order as in [List 1]. (IF the ASIC failed to access the ROM, the ASIC cannot access G/A or DRAM normally.)

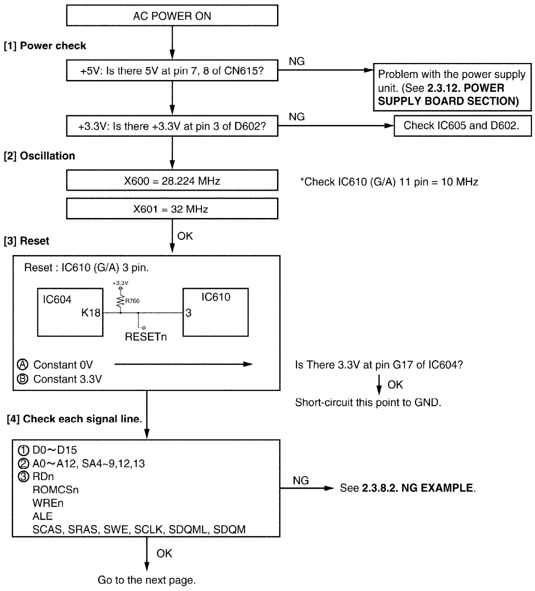
The digital circuit actually operates according to the timing combinations of these signals. So, if the timing of these signals is even slightly off, the circuit will not operate normally. Even of the IC did malfunction, the output voltage level may become abnormal but the timing is accurate according to the specifications. (If oscillation is provided accurately.)

Accordingly, the problem presented here is whether each IC outputs the correct signal. (See the I/O direction diagram on the next page.) In other words, is it constantly switching between 3.3 V (H) and 0 V (L) as described earlier.

Note:

All you have to do is check that the IC repeatedly outputs (H) 3.3 V and (L) 0 V.

After the power is turned on, the ASIC initializes and checks each IC.
The ROM, SDRAM, and modem are checked.
If initialization fails for the ICs , the system will not boot up.
In this case, please find the cause as follows.

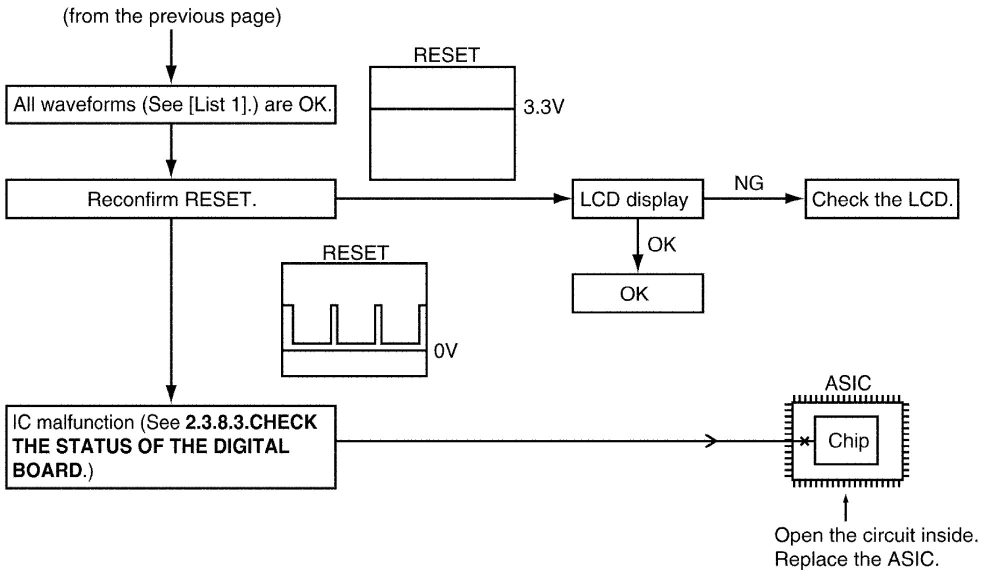

AC POWER ON
[1] Power check
+5V: Is there 5V at pin 7, 8 of CN615?
NG
Problem with the power supply unit. (See 2.3.12. POWER SUPPLY BOARD SECTION)
+3.3V: Is there +3.3V at pin 3 of D602?
NG
Check IC605 and D602.
[2] Oscillation
X600 = 28.224 MHz
*Check IC610 (G/A) 11 pin = 10 MHz
X601 = 32 MHz
OK
[3] Reset
Reset : IC610 (G/A) 3 pin.
IC604
K18
+3.3V
R766
RESETn
IC610
3
Ⓐ Constant 0V
Ⓑ Constant 3.3V
Is There 3.3V at pin G17 of IC604?
OK
Short-circuit this point to GND.
[4] Check each signal line.
① D0～D15
② A0～A12, SA4~9,12,13
③ RDn
ROMCSn
WREn
ALE
SCAS, SRAS, SWE, SCLK, SDQML, SDQM
NG
See 2.3.8.2. NG EXAMPLE.
OK
Go to the next page.

CROSS REFERENCE:

NG EXAMPLE ()

CHECK THE STATUS OF THE DIGITAL BOARD ()

POWER SUPPLY BOARD SECTION ()


(from the previous page)
All waveforms (See [List 1].) are OK.
RESET
3.3V
Reconfirm RESET.
LCD display
NG
Check the LCD.
OK
OK
RESET
0V
IC malfunction (See **2.3.8.3.CHECK THE STATUS OF THE DIGITAL BOARD**.)
ASIC
Chip
Open the circuit inside.
Replace the ASIC.

Other NG examples while the power is ON and the LCD displays the following.

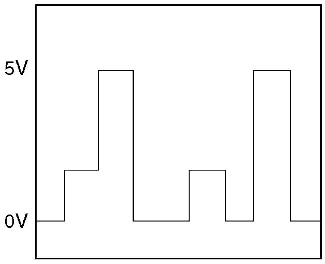
LCD display CALL SERVICE * → The error is displayed when the heater head does not warm up, or the LSU or FAN motor does not work.

CROSS REFERENCE:

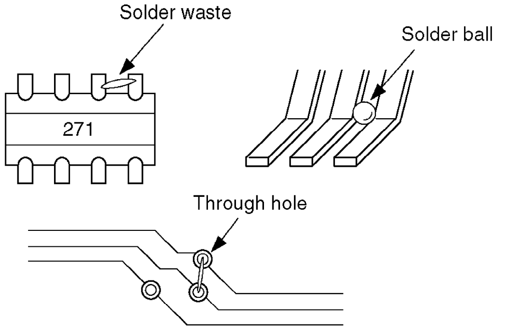
CHECK THE STATUS OF THE DIGITAL BOARD ()

2.3.8.2. NG EXAMPLE

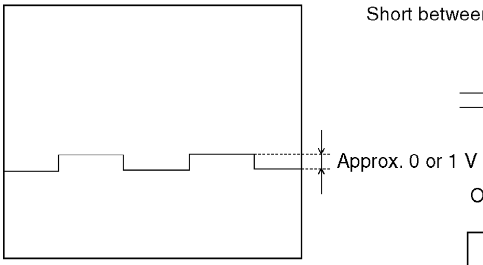
1.



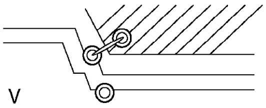
Short circuit from the adjacent signal wires.
Check for a short circuit in the RA and IC leads and the signal wire at the through hole.


Solder waste
Solder ball
271
Through hole

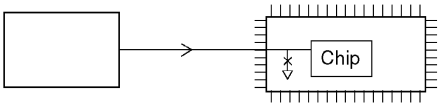
2.



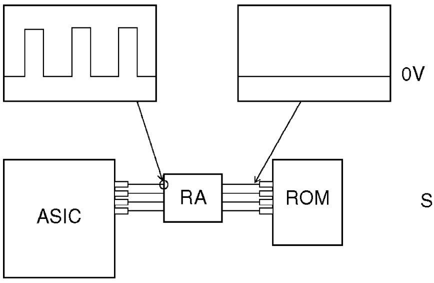
Short between the signal line and GND.



OR IC malfunction



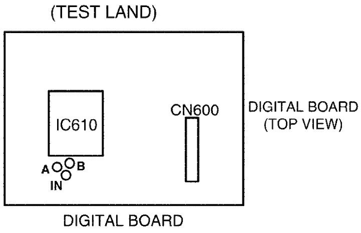
3.

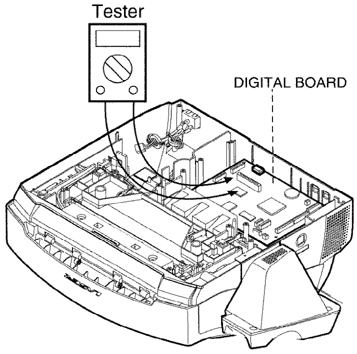

0V
ASIC
RA
ROM

Solder fault on RA.

2.3.8.3. CHECK THE STATUS OF THE DIGITAL BOARD

Please check the status (voltage) of test lands **TP-A** and **TP-B**.
The result may tell you a defective point.





- Turn off the power supply.
- Short using a metallic object, such as tweezers, between the **TP-IN** point and **DG** land, and turn on the AC power for a few seconds. And then remove a metallic object.
- Check the following voltages using an oscilloscope or tester.
- To cancel the status check mode, turn off the AC power.

Defective point	Check point voltage		Check items
	A	B	
RTC (IC604)	5V	5V	IC604(RTC is included in IC604), X601
SDRAM (IC608)	0V	5V	IC608, RA610, RA614, RA622~625, R675, R676, R680, R681
MODEM (IC604)	5V	0V	IC604(MODEM is included in IC604), IC609
ALL OK	0V	0V	

- This indicates that the Add/Data Bus, RAM, ROM, and G/A are all connected to the ASIC properly and that control from the ASIC is possible.

Please check the soldering and conduction of these components.
If there is no problem, replace the ICs.

If you still have a problem with the digital board,
please refer to **NG wave pattern**. (See)

2.3.9. ANALOG BOARD SECTION

This chapter provides the testing procedures required for the analog parts. A signal route to be tested is determined depending upon purposes. For example, the handset TX route begins at the handset microphone and the signal is output to the telephone line. The signal mainly flowing on this route is analog. You can trace the signal with an oscilloscope. The signal flow on each route is shown in the Check Sheet here. If you find a specific problem in the unit, for example if you cannot communicate with the H/S, trace that signal route locally with the following Check Sheet and locate the faulty point.

2.3.9.1. CHECK SHEET

(SYMPTOM) CHECK ITEMS		Signal ROUTE IN → OUT
MONITOR		TEL LINE-T203-R277-R269-C285-IC203(6-7)-J211-C266-R247-C244-R234-L207-IC201(23-34)-C224-L256-R206-IC202(3-2)-L257-R208-C257-IC204(2-1)-R246-C226-R217-IC201(32-35) -R233-C242-IC203(4-5,8)-SPEAKER
HANDSET Tx		HS MIC-CN204(4)-L248-C351-R329-J213-L264- IC201-(14,15-22)-L254-R235-C239-IC202(14-15)- CN204(1)-L241-C350-R332-J214-L265- C243-R239-R271-R276-IC203(2-1)-C312-R293-R292-T203-TEL LINE
HANDSET Rx		TEL LINE-T203-R277-R269-C285-IC203(6-7)-J211-C266-R247-C244-R234-L207-IC201(23-34)-C224-L256-R206-IC202(3-2)-L257-R208-C257-IC204(2-1)-R246-C226-R217-IC201(32-10,11) - J218-L247-CN204(3) HS SPEAKER J202-C359-L243-CN204(2)
DTMF Monitor	Speaker	{IC604(P3)-IC609(20-9,10)- CN616(21)}-CN202(8)-C256-R244-L212-R249- IC204(5,6-7)-C219-R222- CN616(20)}-CN202(9)-C254-R245-L211-R248- IC201(24-35)-R233-C242-IC203(4-5,8)-SPEAKER
	Handset	{IC604(P3)-IC609(20-9,10)- CN616(21)}-CN202(8)-C256-R244-L212-R249- IC204(5,6-7)-C219-R222- CN616(20)}-CN202(9)-C254-R245-L211-R248- IC201(24-10,11) - J218-L247-CN204(3) HS SPEAKER J202-C359-L243-CN204(2)
DTMF for TEL Line FAX Tx		{IC604(P3)-IC609(20-9,10)- CN616(21)}-CN202(8)-C256-R244-L212-R249- IC204(5,6-7)-C219-R222- CN616(20)}-CN202(9)-C254-R245-L211-R248- IC201(24-22)-L254-R235-C239-IC202(14-15)-C243-R239-R271-R276-IC203(2-1)-C312-R293-R292-T203-TEL LINE
Ringing/Alarm/ Beep/Key tones		{IC604(V9)-C761-R761-CN616(11)}-CN202(18)-C214-R221-IC201(27-35)-R233-C242-IC203(4-5,8)-SPEAKER
CNG/DTMF detection (ON-HOOK) CALLER ID		TEL LINE-T203-R277-R269-C285-IC203(6-7)-J211-C266-R247-C227-R223-IC201(20-31)-CN202(4)-{CN616(25)-L666-C723-R707-IC609(13-22)-IC604(P1)
CNG/DTMF detection (OFF-HOOK)		TEL LINE-T203-R277-R269-C285-IC203(6-7)-J211-C266-R247-C244-R234-L207-IC201(23-31)-CN202(4)-{CN616(25)-L666-C723-R707-IC609(13-22)-IC604(P1)

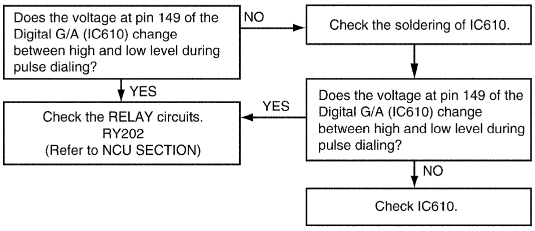
Note: { }: Inside the digital board

2.3.9.2. DEFECTIVE ITS (Integrated Telephone System) SECTION

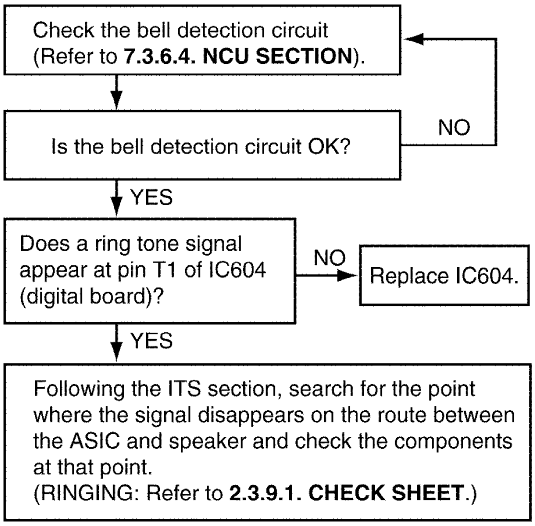
1. No handset and speakerphone transmission / reception

Perform a signal test in the ITS or the NCU section and locate a defective point (where the signal disappears) on each route between the handset microphone and telephone line (sending), or between the telephone line and the handset speaker (receiving), or between the microphone and the telephone line (sending), or between the telephone line and the speaker (receiving). Check the components at that point. CHECK SHEET() is useful for this investigation.

2. No pulse dialing

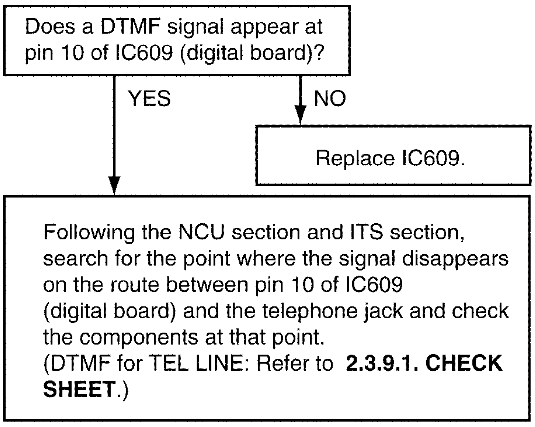

Does the voltage at pin 149 of the Digital G/A (IC610) change between high and low level during pulse dialing?
NO
Check the soldering of IC610.
YES
Check the RELAY circuits. RY202 (Refer to NCU SECTION)
YES
Does the voltage at pin 149 of the Digital G/A (IC610) change between high and low level during pulse dialing?
NO
Check IC610.

3. No ring tone (or No bell)


Check the bell detection circuit
(Refer to 7.3.6.4. NCU SECTION).
Is the bell detection circuit OK?
NO
YES
Does a ring tone signal appear at pin T1 of IC604 (digital board)?
NO
Replace IC604.
YES
Following the ITS section, search for the point where the signal disappears on the route between the ASIC and speaker and check the components at that point.
(RINGING: Refer to 2.3.9.1. CHECK SHEET.)

CROSS REFERENCE:
CHECK SHEET ()
NCU SECTION ()

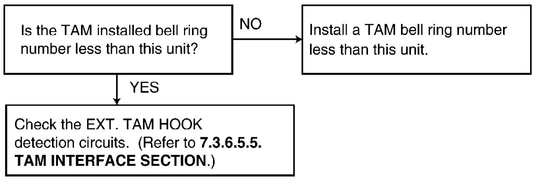
4. No tone dialing


Does a DTMF signal appear at pin 10 of IC609 (digital board)?
YES
NO
Replace IC609.
Following the NCU section and ITS section, search for the point where the signal disappears on the route between pin 10 of IC609 (digital board) and the telephone jack and check the components at that point.
(DTMF for TEL LINE: Refer to 2.3.9.1. CHECK SHEET.)

CROSS REFERENCE:
CHECK SHEET ()

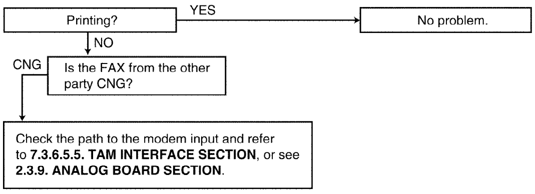
2.3.9.3. DETECTIVE TAM INTERFACE SECTION

1. The FAX turns on, but does not arrive through TAM.


Is the TAM installed bell ring number less than this unit?
NO
Install a TAM bell ring number less than this unit.
YES
Check the EXT. TAM HOOK detection circuits. (Refer to 7.3.6.5.5. TAM INTERFACE SECTION.)

CROSS REFERENCE:
TAM INTERFACE SECTION ()

2. A FAX is received, but won't switch from TAM to FAX.

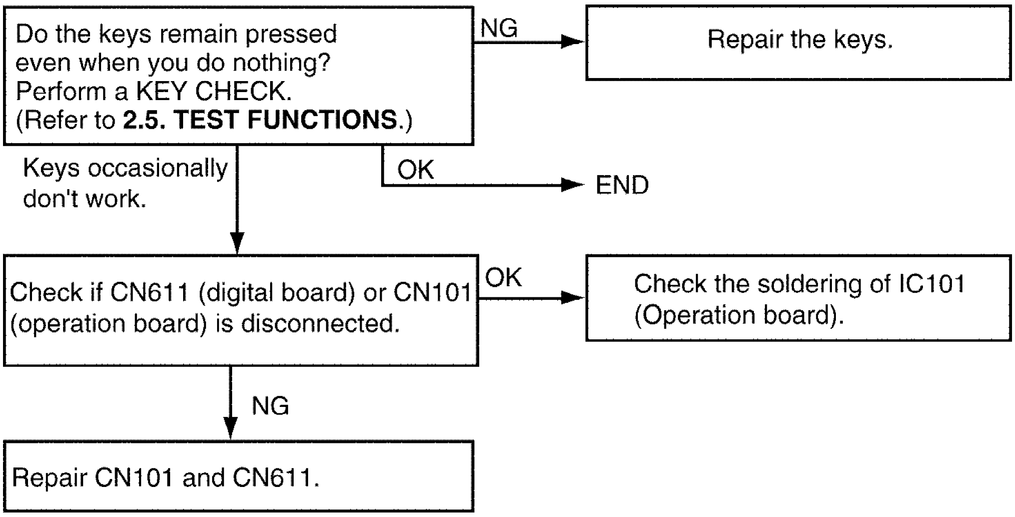

Printing?
YES
No problem.
NO
CNG
Is the FAX from the other party CNG?
Check the path to the modem input and refer to 7.3.6.5.5. TAM INTERFACE SECTION, or see 2.3.9. ANALOG BOARD SECTION.

CROSS REFERENCE:
ANALOG BOARD SECTION ()
TAM INTERFACE SECTION ()

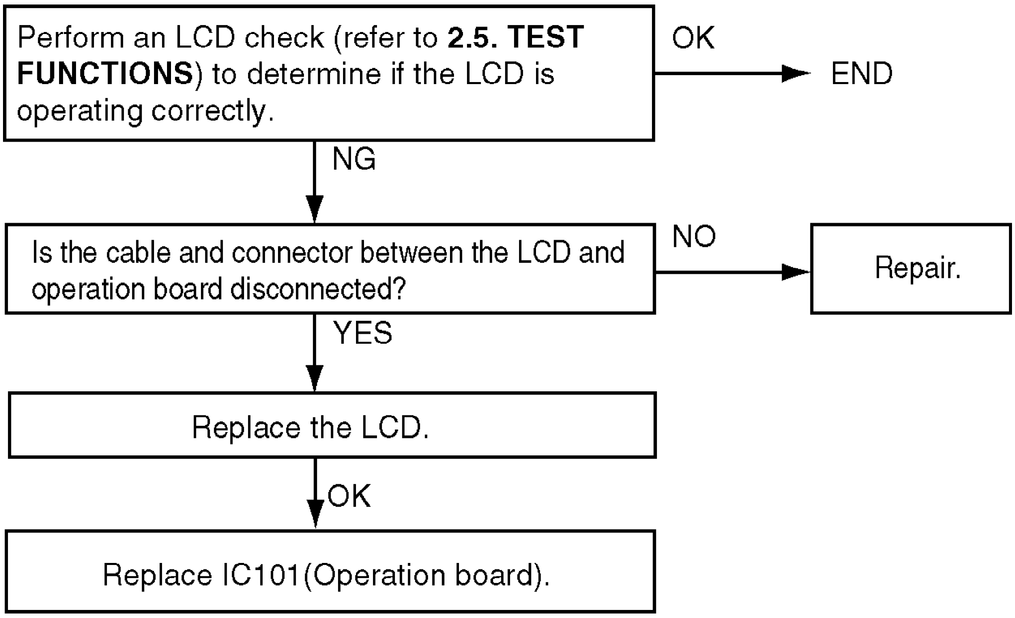
2.3.9.4. OPERATION PANEL SECTION

Refer to TEST FUNCTIONS ().

1. NO KEY OPERATION


Do the keys remain pressed even when you do nothing? Perform a KEY CHECK. (Refer to 2.5. TEST FUNCTIONS.)
NG
Repair the keys.
Keys occasionally don't work.
OK
END
Check if CN611 (digital board) or CN101 (operation board) is disconnected.
OK
Check the soldering of IC101 (Operation board).
NG
Repair CN101 and CN611.

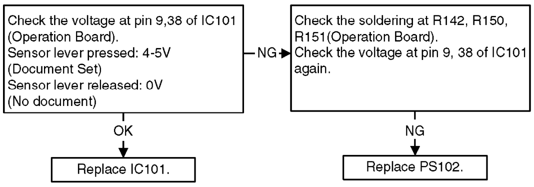
2. NO LCD INDICATION


Perform an LCD check (refer to 2.5. TEST FUNCTIONS) to determine if the LCD is operating correctly.
OK
END
NG
Is the cable and connector between the LCD and operation board disconnected?
NO
Repair.
YES
Replace the LCD.
OK
Replace IC101(Operation board).

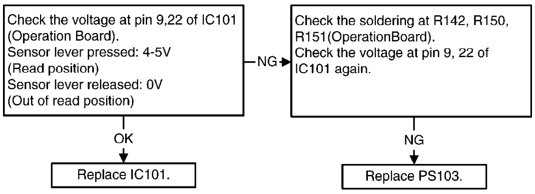
2.3.9.5. SENSOR SECTION

Refer to SENSORS AND SWITCHES for the circuit description.
Perform an SENSOR CHECK to determine if the sensor is operating correctly.

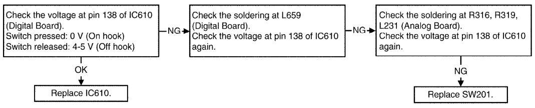
1. Check the document sensor.........."CHECK DOCUMENT"


Check the voltage at pin 9,38 of IC101
(Operation Board).
Sensor lever pressed: 4-5V
(Document Set)
Sensor lever released: 0V
(No document)
NG
Check the soldering at R142, R150, R151(Operation Board).
Check the voltage at pin 9, 38 of IC101 again.
OK
Replace IC101.
NG
Replace PS102.

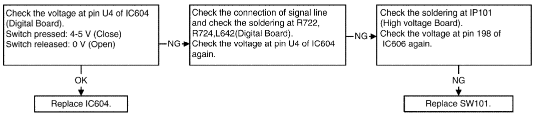
2. Check the paper feed sensor.........."REMOVE DOCUMENT"


Check the voltage at pin 9,22 of IC101
(Operation Board).
Sensor lever pressed: 4-5V
(Read position)
Sensor lever released: 0V
(Out of read position)
NG
Check the soldering at R142, R150, R151(OperationBoard).
Check the voltage at pin 9, 22 of IC101 again.
OK
Replace IC101.
NG
Replace PS103.

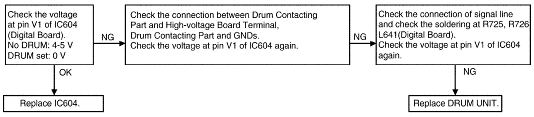
3. Check the hook switch


Check the voltage at pin 138 of IC610
(Digital Board).
Switch pressed: 0 V (On hook)
Switch released: 4-5 V (Off hook)
NG
Check the soldering at L659
(Digital Board).
Check the voltage at pin 138 of IC610 again.
NG
Check the soldering at R316, R319, L231 (Analog Board).
Check the voltage at pin 138 of IC610 again.
OK
Replace IC610.
NG
Replace SW201.

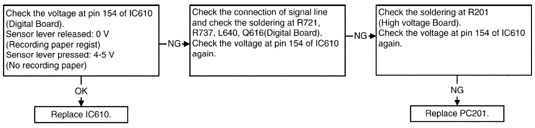
4. Check the cover open switch.........."COVER OPEN"


Check the voltage at pin U4 of IC604
(Digital Board).
Switch pressed: 4-5 V (Close)
Switch released: 0 V (Open)
NG
Check the connection of signal line and check the soldering at R722, R724,L642(Digital Board).
Check the voltage at pin U4 of IC604 again.
NG
Check the soldering at IP101
(High voltage Board).
Check the voltage at pin 198 of IC606 again.
OK
Replace IC604.
NG
Replace SW101.

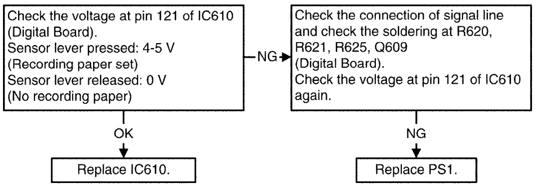
5. Check the DRUM sensor.........."CHECK DRUM"


Check the voltage at pin V1 of IC604 (Digital Board).
No DRUM: 4-5 V
DRUM set: 0 V
NG
Check the connection between Drum Contacting Part and High-voltage Board Terminal, Drum Contacting Part and GNDs.
Check the voltage at pin V1 of IC604 again.
NG
Check the connection of signal line and check the soldering at R725, R726 L641(Digital Board).
Check the voltage at pin V1 of IC604 again.
OK
Replace IC604.
NG
Replace DRUM UNIT.

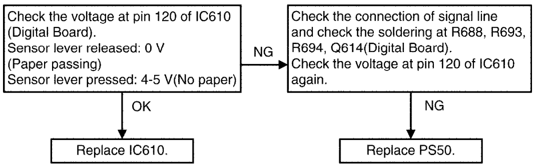
6. Check the regist sensor.........."FAILED PICKUP"


Check the voltage at pin 154 of IC610 (Digital Board).
Sensor lever released: 0 V
(Recording paper regist)
Sensor lever pressed: 4-5 V
(No recording paper)
NG
Check the connection of signal line and check the soldering at R721, R737, L640, Q616(Digital Board).
Check the voltage at pin 154 of IC610 again.
NG
Check the soldering at R201 (High voltage Board).
Check the voltage at pin 154 of IC610 again.
OK
Replace IC610.
NG
Replace PC201.

7. Check the paper sensor.........."OUT OF PAPER"


Check the voltage at pin 121 of IC610 (Digital Board).
Sensor lever pressed: 4-5 V
(Recording paper set)
Sensor lever released: 0 V
(No recording paper)
NG
Check the connection of signal line and check the soldering at R620, R621, R625, Q609 (Digital Board).
Check the voltage at pin 121 of IC610 again.
OK
Replace IC610.
NG
Replace PS1.

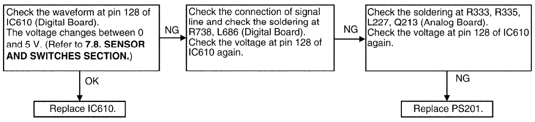
8. Check the exit switch.........."PAPER JAMED"


Check the voltage at pin 120 of IC610 (Digital Board).
Sensor lever released: 0 V
(Paper passing)
Sensor lever pressed: 4-5 V(No paper)
NG
Check the connection of signal line and check the soldering at R688, R693, R694, Q614(Digital Board).
Check the voltage at pin 120 of IC610 again.
OK
Replace IC610.
NG
Replace PS50.

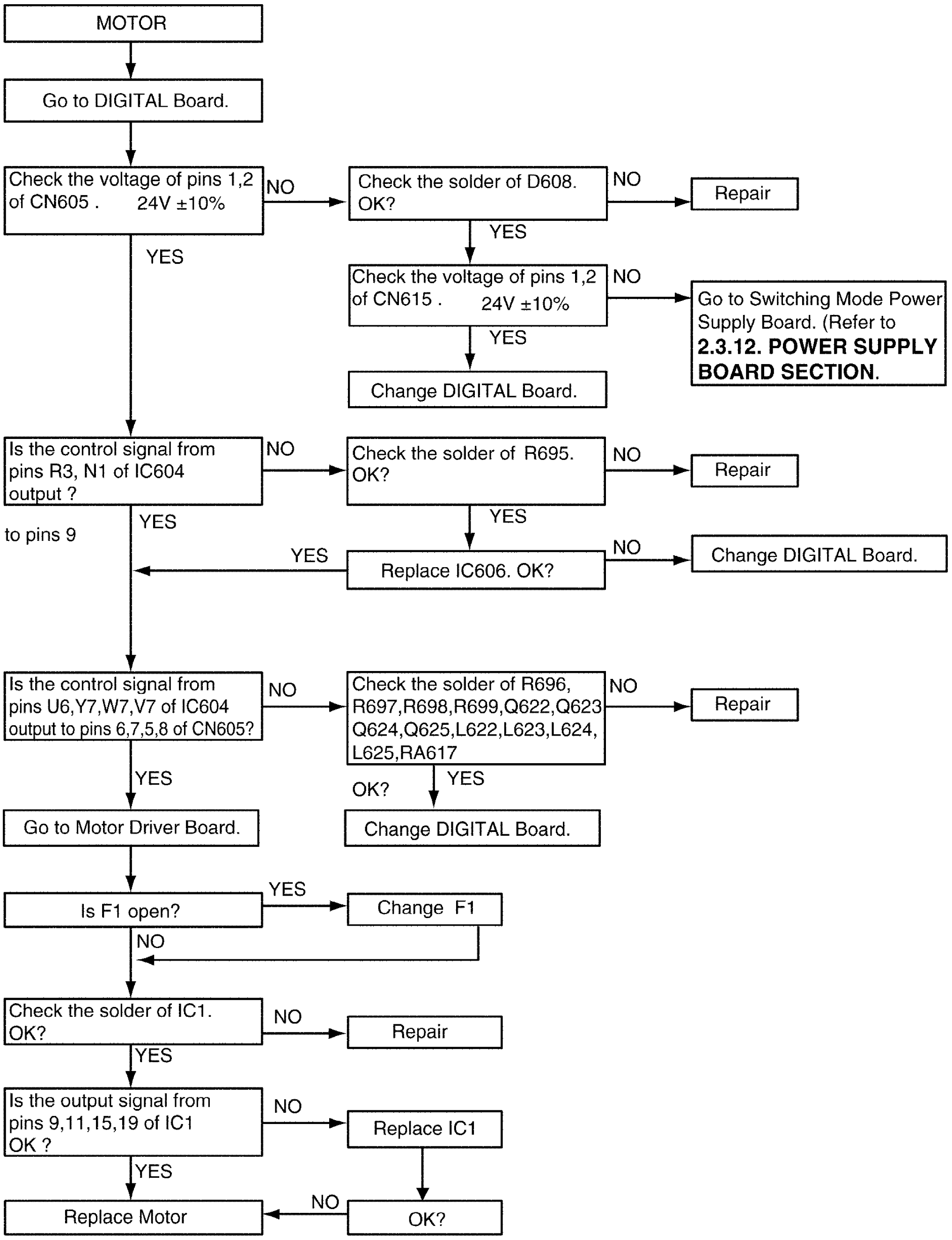
9. Check the toner sensor.........."TONER LOW","CHECK TONER"

Note:

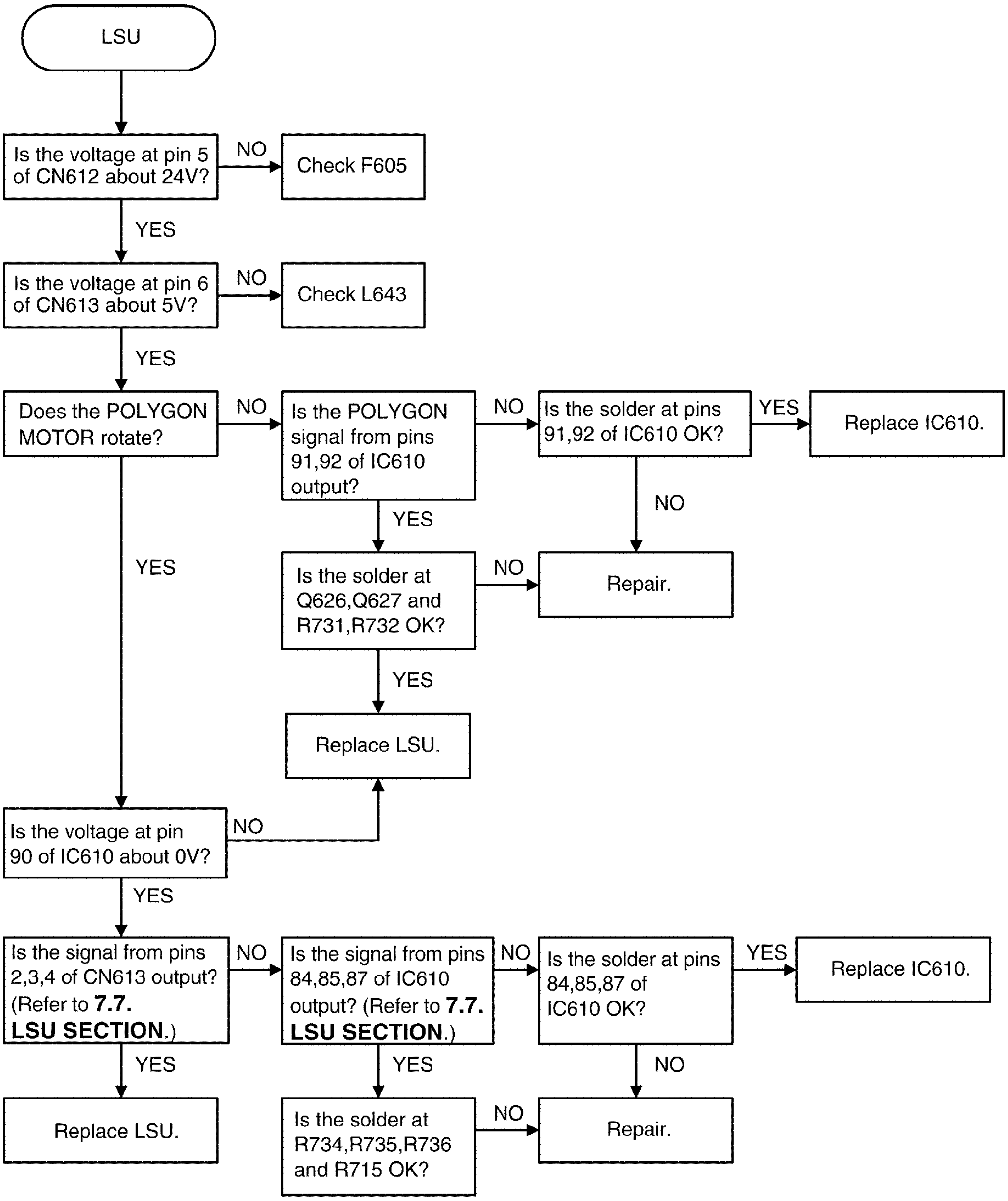
As for the following check, remove the drum from the main body, set it again and close the cover, then perform that check during initializing operation. Refer to SENSORS AND SWITCHES SECTION ().


Check the waveform at pin 128 of IC610 (Digital Board).
The voltage changes between 0 and 5 V. (Refer to 7.8. SENSOR AND SWITCHES SECTION.)
NG
Check the connection of signal line and check the soldering at R738, L686 (Digital Board).
Check the voltage at pin 128 of IC610 again.
NG
Check the soldering at R333, R335, L227, Q213 (Analog Board).
Check the voltage at pin 128 of IC610 again.
OK
Replace IC610.
NG
Replace PS201.

2.3.9.6. MOTOR SECTION


MOTOR
Go to DIGITAL Board.
Check the voltage of pins 1,2 of CN605 . 24V ±10%
NO
Check the solder of D608. OK?
NO
Repair
YES
YES
Check the voltage of pins 1,2 of CN615 . 24V ±10%
NO
Go to Switching Mode Power Supply Board. (Refer to 2.3.12. POWER SUPPLY BOARD SECTION.
YES
Change DIGITAL Board.
Is the control signal from pins R3, N1 of IC604 output ?
to pins 9
NO
Check the solder of R695. OK?
NO
Repair
YES
YES
YES
Replace IC606. OK?
NO
Change DIGITAL Board.
Is the control signal from pins U6,Y7,W7,V7 of IC604 output to pins 6,7,5,8 of CN605?
NO
Check the solder of R696, R697,R698,R699,Q622,Q623 Q624,Q625,L622,L623,L624, L625,RA617
NO
Repair
YES
OK?
YES
Go to Motor Driver Board.
Change DIGITAL Board.
YES
Is F1 open?
Change F1
NO
Check the solder of IC1. OK?
NO
Repair
YES
Is the output signal from pins 9,11,15,19 of IC1 OK ?
NO
Replace IC1
YES
NO
Replace Motor
OK?

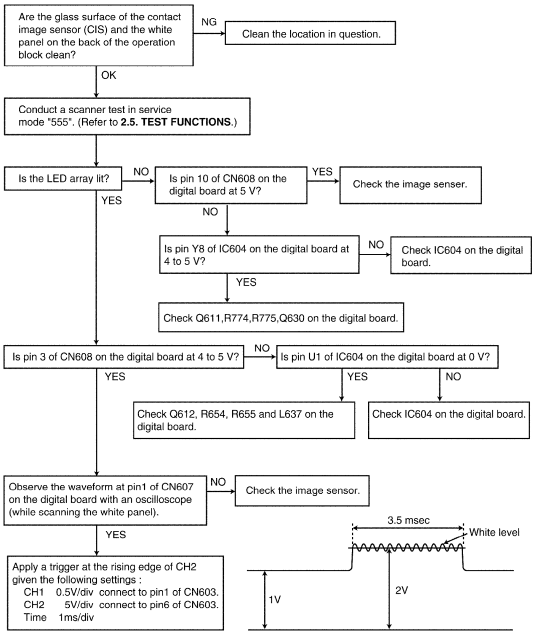
2.3.9.7. LSU SECTION


LSU
Is the voltage at pin 5 of CN612 about 24V?
NO
Check F605
YES
Is the voltage at pin 6 of CN613 about 5V?
NO
Check L643
YES
Does the POLYGON MOTOR rotate?
NO
Is the POLYGON signal from pins 91,92 of IC610 output?
NO
Is the solder at pins 91,92 of IC610 OK?
YES
Replace IC610.
NO
Repair.
YES
Is the solder at Q626,Q627 and R731,R732 OK?
NO
YES
Replace LSU.
YES
Is the voltage at pin 90 of IC610 about 0V?
NO
YES
Is the signal from pins 2,3,4 of CN613 output? (Refer to 7.7. LSU SECTION.)
NO
Is the signal from pins 84,85,87 of IC610 output? (Refer to 7.7. LSU SECTION.)
NO
Is the solder at pins 84,85,87 of IC610 OK?
YES
Replace IC610.
NO
Repair.
YES
Replace LSU.
YES
Is the solder at R734,R735,R736 and R715 OK?
NO

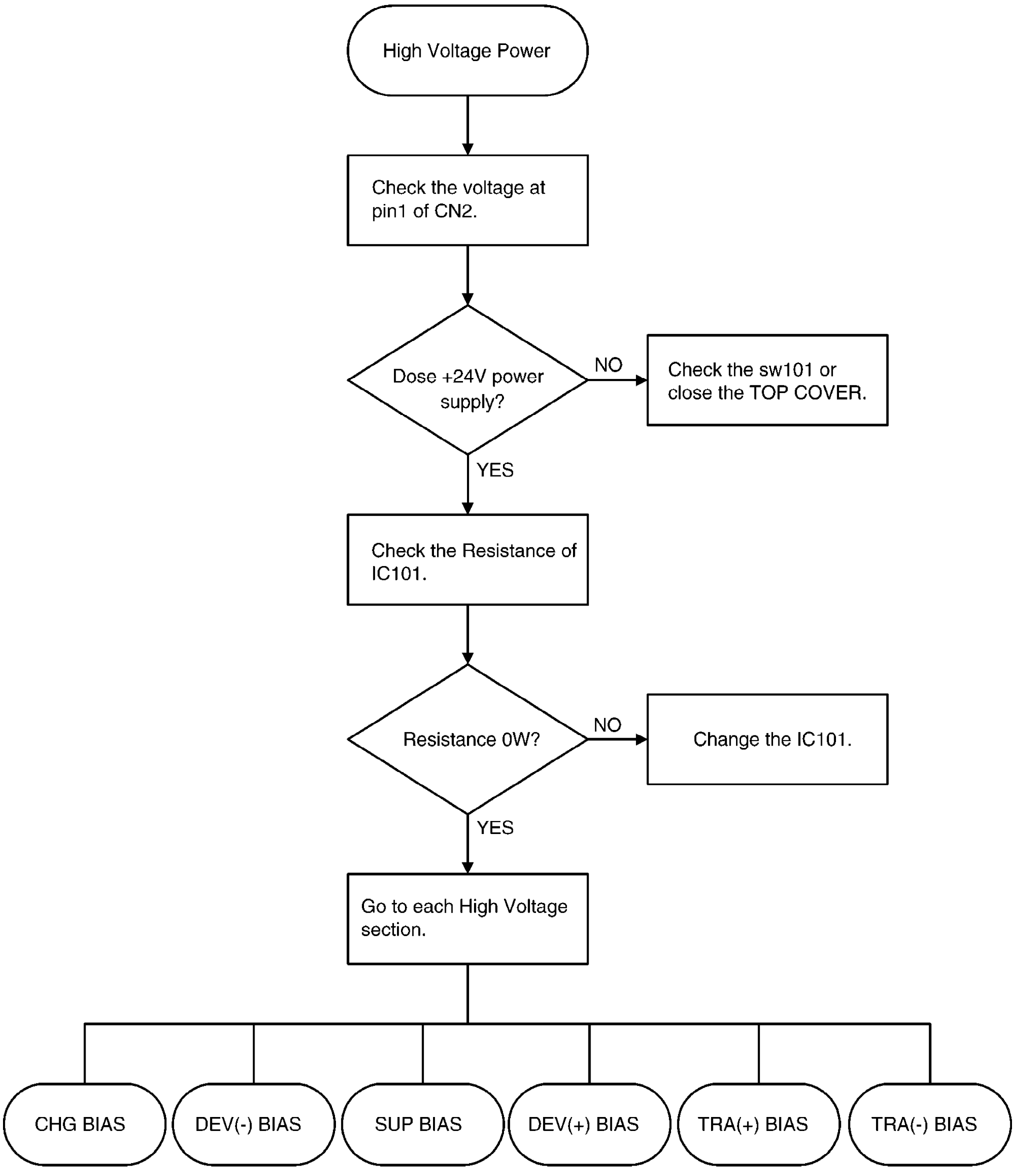
CROSS REFERENCE:

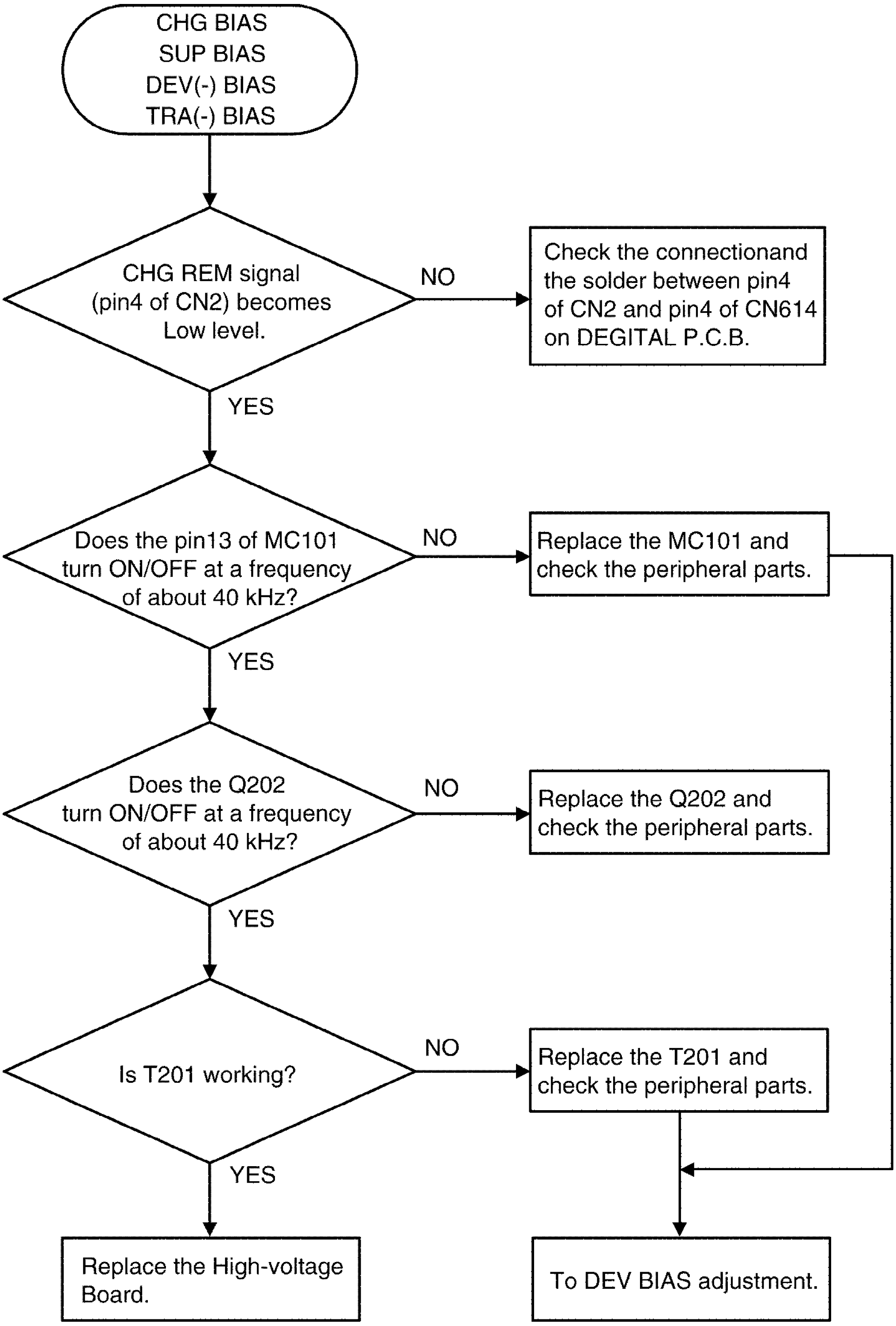
LSU (Laser Scanning Unit) SECTION ()

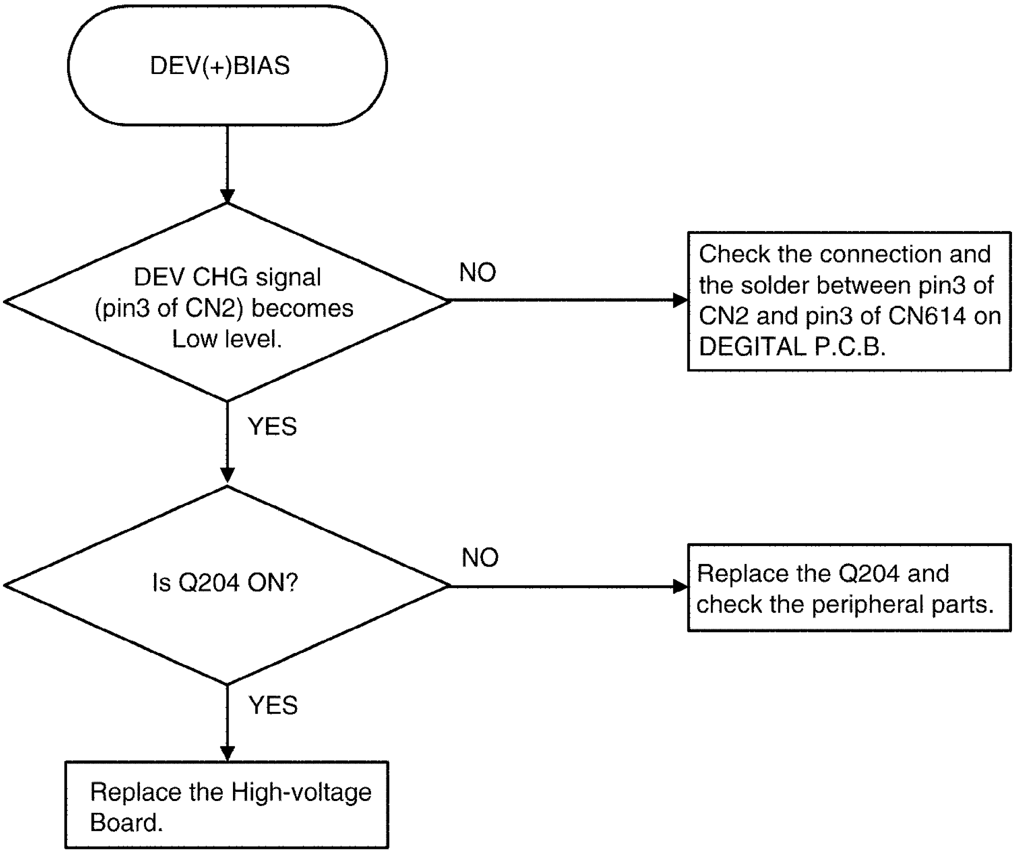
2.3.10. CIS (contact Image Sensor) SECTION

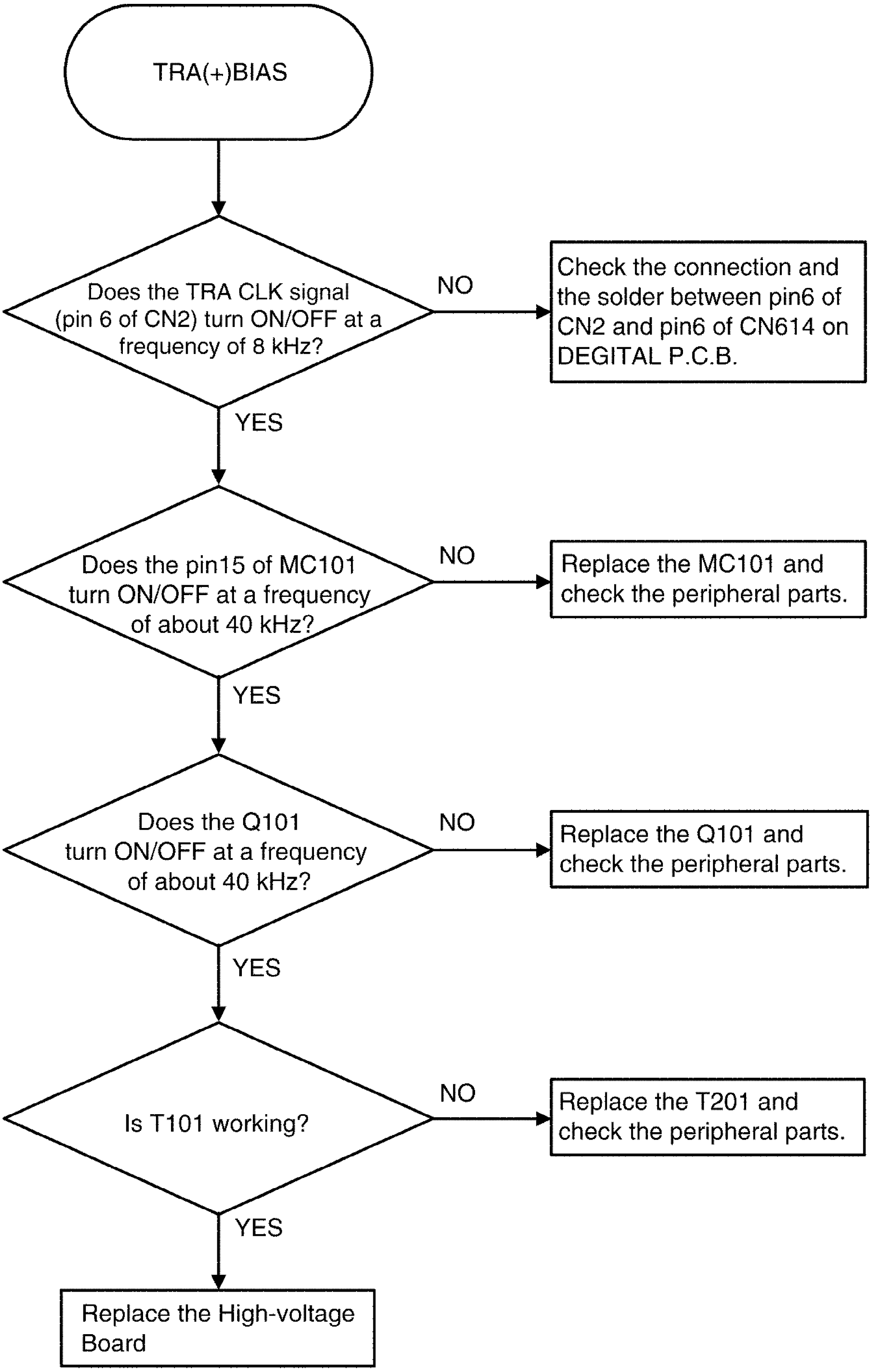

Are the glass surface of the contact image sensor (CIS) and the white panel on the back of the operation block clean?
NG
Clean the location in question.
OK
Conduct a scanner test in service mode "555". (Refer to 2.5. TEST FUNCTIONS.)
Is the LED array lit?
NO
Is pin 10 of CN608 on the digital board at 5 V?
YES
Check the image senser.
NO
Is pin Y8 of IC604 on the digital board at 4 to 5 V?
NO
Check IC604 on the digital board.
YES
Check Q611,R774,R775,Q630 on the digital board.
YES
Is pin 3 of CN608 on the digital board at 4 to 5 V?
NO
Is pin U1 of IC604 on the digital board at 0 V?
YES
Check Q612, R654, R655 and L637 on the digital board.
NO
Check IC604 on the digital board.
YES
Observe the waveform at pin1 of CN607 on the digital board with an oscilloscope (while scanning the white panel).
NO
Check the image sensor.
YES
Apply a trigger at the rising edge of CH2 given the following settings :
CH1 0.5V/div connect to pin1 of CN603.
CH2 5V/div connect to pin6 of CN603.
Time 1ms/div
3.5 msec
White level
1V
2V

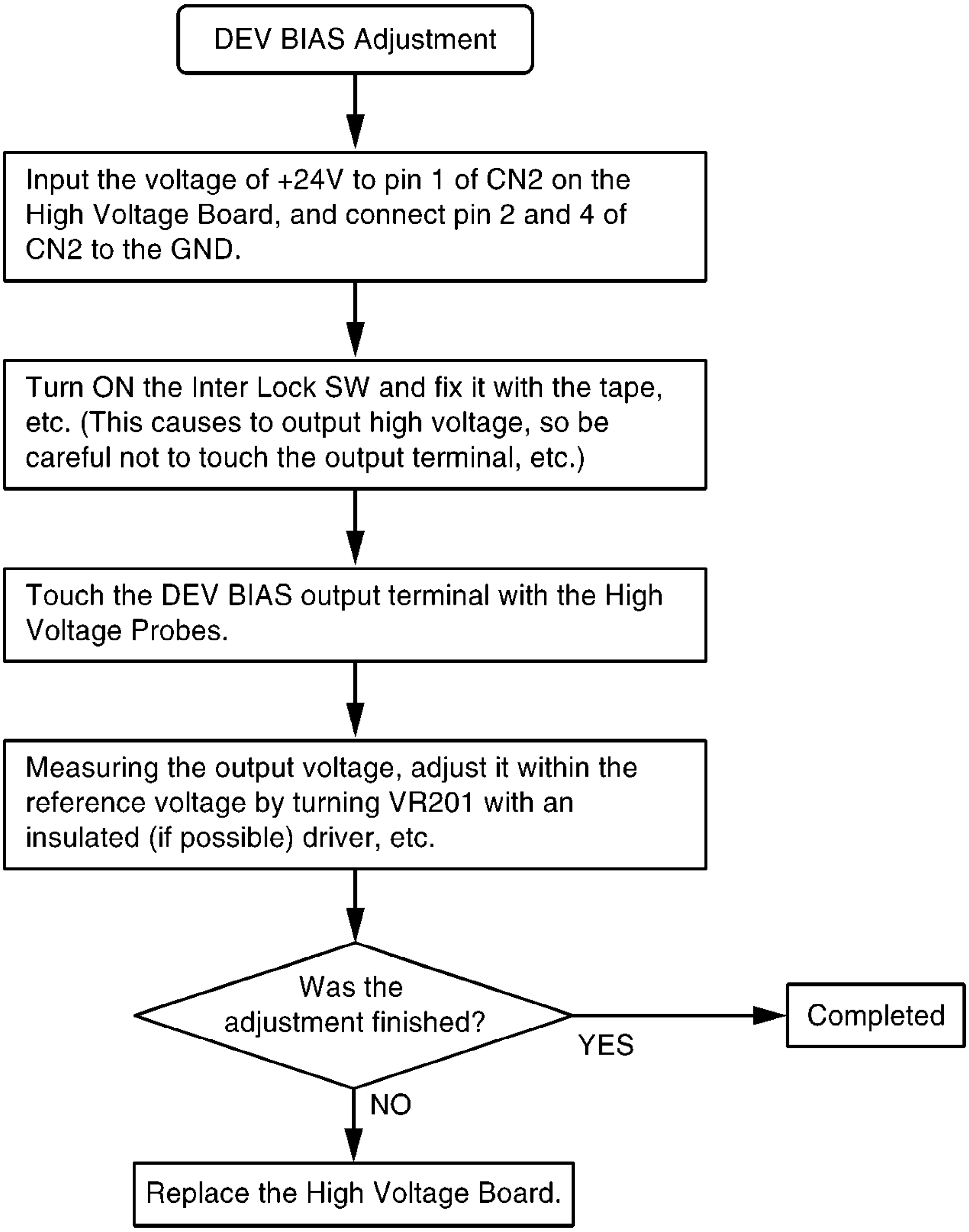
2.3.11. HIGH VOLTAGE SECTION


High Voltage Power
Check the voltage at pin1 of CN2.
Dose +24V power supply?
NO
Check the sw101 or close the TOP COVER.
YES
Check the Resistance of IC101.
Resistance 0W?
NO
Change the IC101.
YES
Go to each High Voltage section.
CHG BIAS
DEV(-) BIAS
SUP BIAS
DEV(+) BIAS
TRA(+) BIAS
TRA(-) BIAS


CHG BIAS
SUP BIAS
DEV(-) BIAS
TRA(-) BIAS
CHG REM signal (pin4 of CN2) becomes Low level.
NO
Check the connectionand the solder between pin4 of CN2 and pin4 of CN614 on DEGITAL P.C.B.
YES
Does the pin13 of MC101 turn ON/OFF at a frequency of about 40 kHz?
NO
Replace the MC101 and check the peripheral parts.
YES
Does the Q202 turn ON/OFF at a frequency of about 40 kHz?
NO
Replace the Q202 and check the peripheral parts.
YES
Is T201 working?
NO
Replace the T201 and check the peripheral parts.
YES
Replace the High-voltage Board.
To DEV BIAS adjustment.


DEV(+)BIAS
DEV CHG signal (pin3 of CN2) becomes Low level.
NO
Check the connection and the solder between pin3 of CN2 and pin3 of CN614 on DEGITAL P.C.B.
YES
Is Q204 ON?
NO
Replace the Q204 and check the peripheral parts.
YES
Replace the High-voltage Board.


TRA(+)BIAS
Does the TRA CLK signal (pin 6 of CN2) turn ON/OFF at a frequency of 8 kHz?
NO
Check the connection and the solder between pin6 of CN2 and pin6 of CN614 on DEGITAL P.C.B.
YES
Does the pin15 of MC101 turn ON/OFF at a frequency of about 40 kHz?
NO
Replace the MC101 and check the peripheral parts.
YES
Does the Q101 turn ON/OFF at a frequency of about 40 kHz?
NO
Replace the Q101 and check the peripheral parts.
YES
Is T101 working?
NO
Replace the T201 and check the peripheral parts.
YES
Replace the High-voltage Board


DEV BIAS Adjustment
Input the voltage of +24V to pin 1 of CN2 on the High Voltage Board, and connect pin 2 and 4 of CN2 to the GND.
Turn ON the Inter Lock SW and fix it with the tape, etc. (This causes to output high voltage, so be careful not to touch the output terminal, etc.)
Touch the DEV BIAS output terminal with the High Voltage Probes.
Measuring the output voltage, adjust it within the reference voltage by turning VR201 with an insulated (if possible) driver, etc.
Was the adjustment finished?
YES
Completed
NO
Replace the High Voltage Board.

*** This Adjustment should be done with a single High Voltage Board.**
*** As for the High Voltage Probe, HV PROBE 9014 of HIOKI electric co. or the equivalent should be used.**
*** As for the tester, FLUKE 85 III multimeter or the equivalent should be used.**
*** Be careful not to touch the terminals during adjustment because the high voltage is used.**

2.3.12. POWER SUPPLY BOARD SECTION

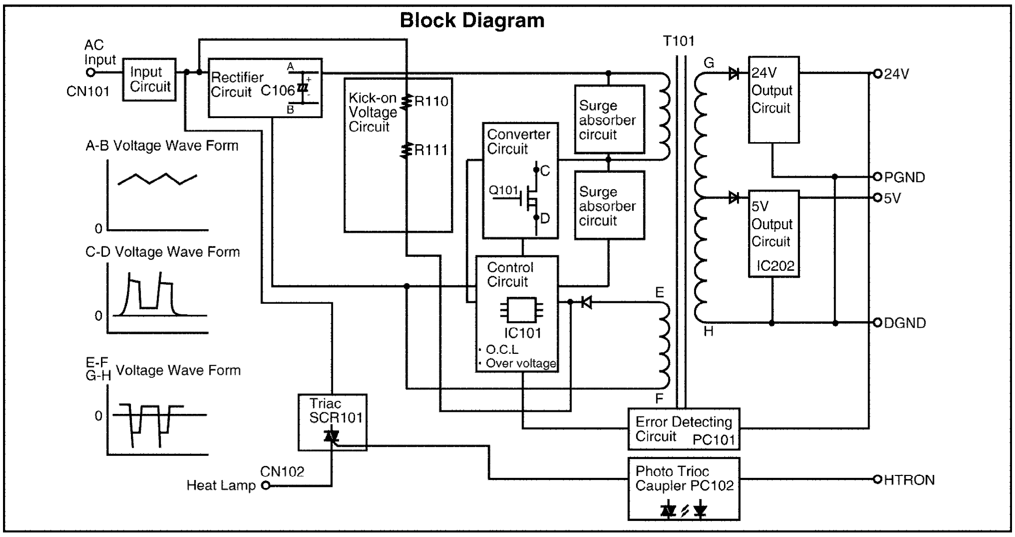
2.3.12.1. KEY COMPONENTS FOR TROUBLESHOOTING

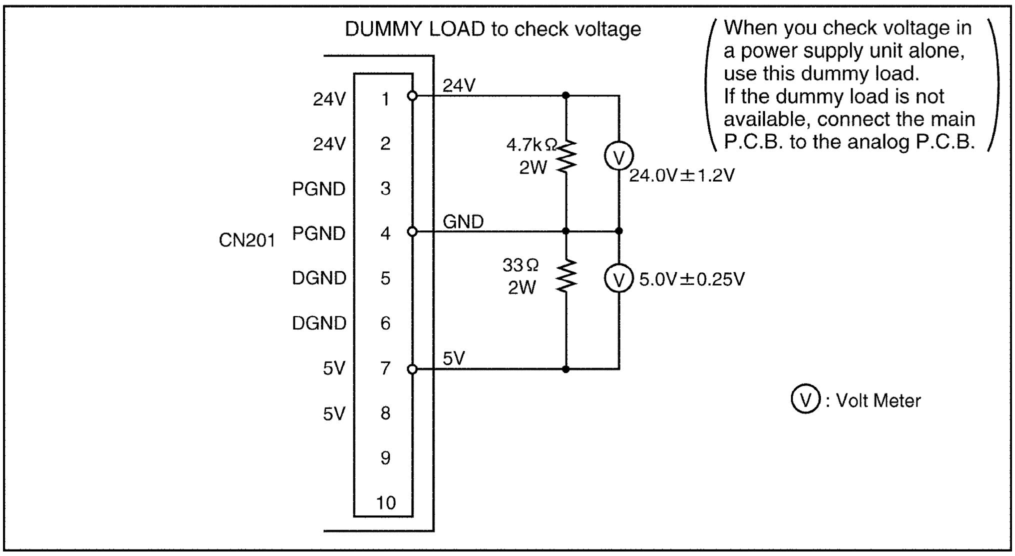
Check the following parts first: F101, D101-D104, C106, Q101, PC101 and IC101.
This comes from our experience with experimental tests. For example: power supply and lightning surge voltage test, withstanding voltage test, intentional short circuit test, etc.

Caution:

If you find a melted fuse in the unit, do not turn on the power until you locate and repair the faulty parts (except for the fuse); otherwise the fuse will melt again and you cannot pinpoint the faulty point.

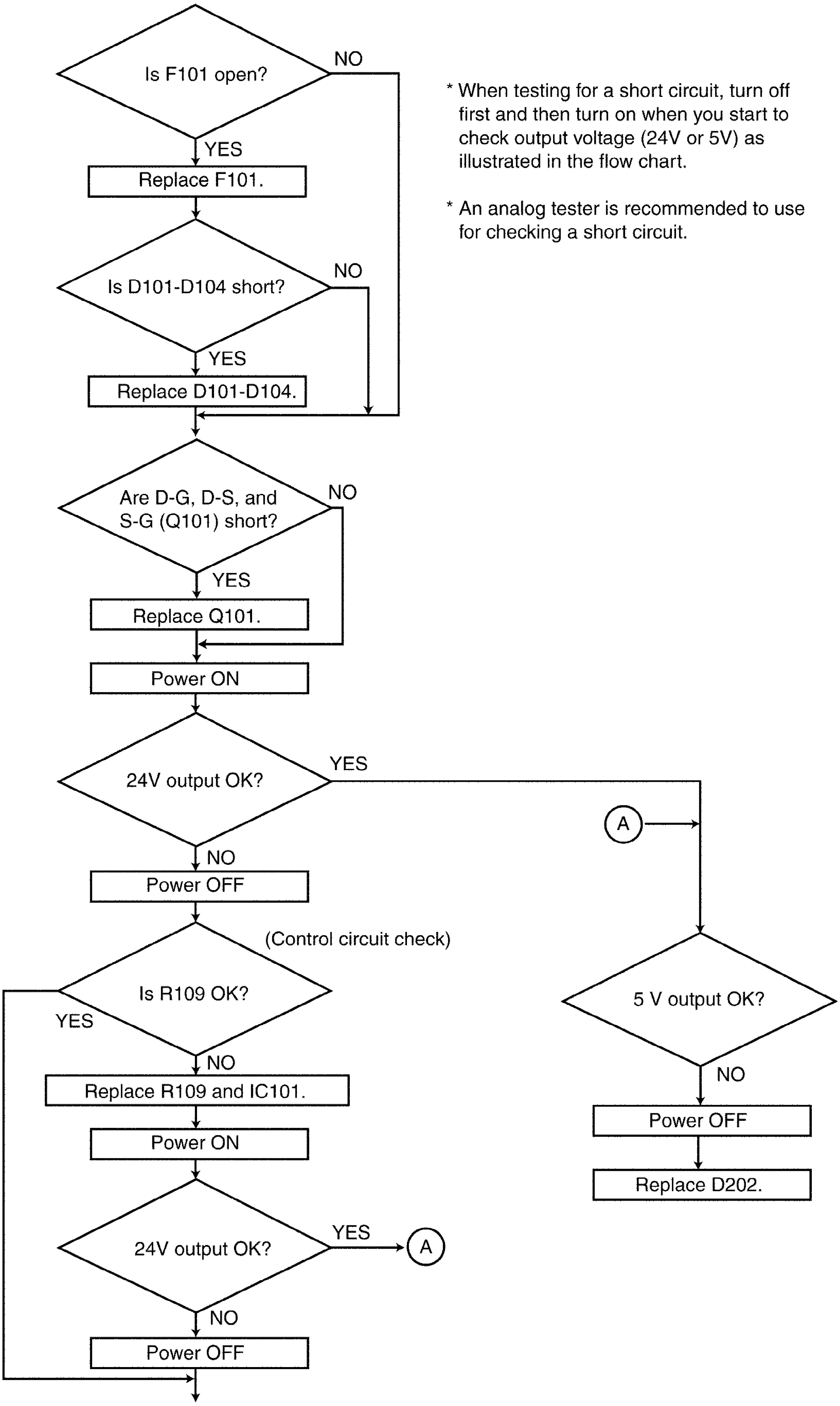
In most cases, the symptom is that nothing is output. It is more likely that the fault is in the primary side rather than the secondary side. Check the primary side first.


Block Diagram
AC Input
CN101
Input Circuit
Rectifier Circuit C106
A
B
Kick-on Voltage Circuit
R110
R111
Converter Circuit
Q101
C
D
Surge absorber circuit
Surge absorber circuit
T101
G
24V Output Circuit
24V
PGND
5V
5V Output Circuit
IC202
DGND
H
E
F
Control Circuit
IC101
• O.C.L
• Over voltage
Error Detecting Circuit PC101
Photo Triac Caupler PC102
HTRON
Triac SCR101
CN102
Heat Lamp
A-B Voltage Wave Form
0
C-D Voltage Wave Form
0
E-F
G-H Voltage Wave Form
0


DUMMY LOAD to check voltage
CN201
24V 1
24V 2
PGND 3
PGND 4
DGND 5
DGND 6
5V 7
5V 8
9
10
24V
GND
5V
4.7kΩ 2W
33Ω 2W
V
24.0V±1.2V
V
5.0V±0.25V
V : Volt Meter

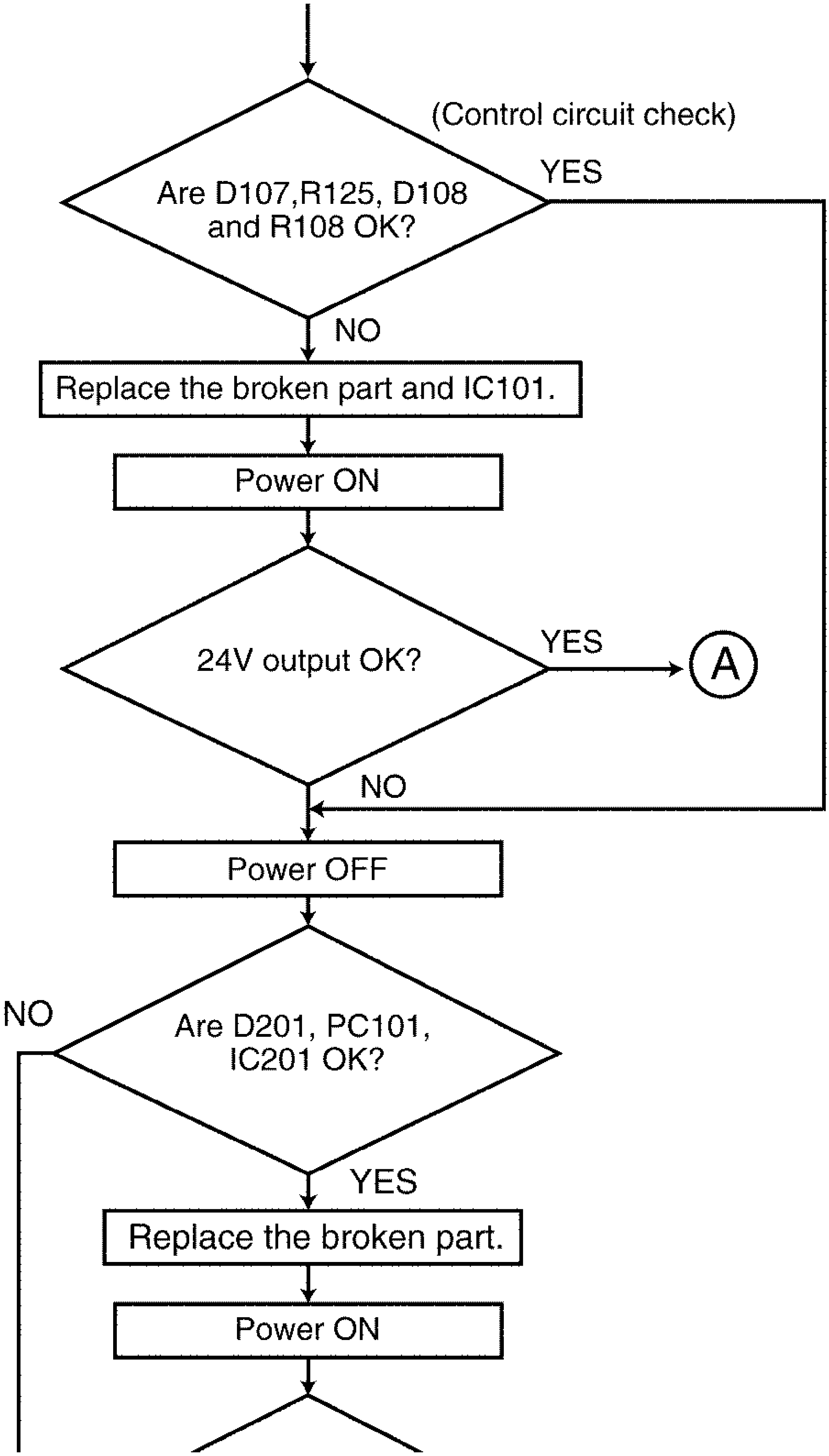
When you check voltage in a power supply unit alone, use this dummy load. If the dummy load is not available, connect the main P.C.B. to the analog P.C.B.

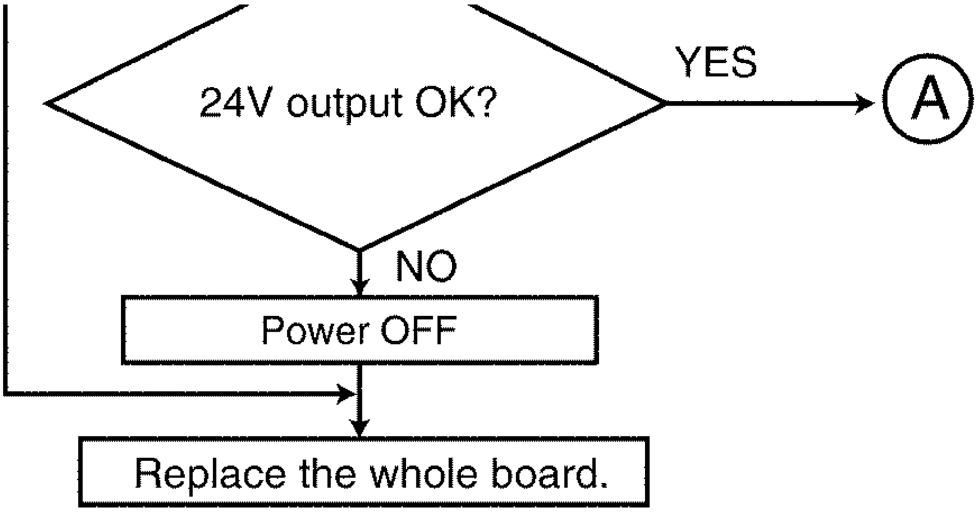
2.3.12.2. TROUBLESHOOTING FLOW CHART


Is F101 open?
NO
YES
Replace F101.
Is D101-D104 short?
NO
YES
Replace D101-D104.
Are D-G, D-S, and S-G (Q101) short?
NO
YES
Replace Q101.
Power ON
24V output OK?
YES
A
NO
Power OFF
(Control circuit check)
Is R109 OK?
YES
NO
Replace R109 and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
5 V output OK?
NO
Power OFF
Replace D202.

* When testing for a short circuit, turn off first and then turn on when you start to check output voltage (24V or 5V) as illustrated in the flow chart.

* An analog tester is recommended to use for checking a short circuit.


(Control circuit check)
Are D107,R125, D108 and R108 OK?
YES
NO
Replace the broken part and IC101.
Power ON
24V output OK?
YES
A
NO
Power OFF
NO
Are D201, PC101, IC201 OK?
YES
Replace the broken part.
Power ON



2.3.12.3. BROKEN PARTS REPAIR DETAILS

(D101~D104)

Check for a short-circuit in terminal 4. If D101~D104 is short-circuit, F101 will melt (open).
In this case, replace all of the parts (D101~D104, F101).

(Q101)

The worst case of Q101 is a short-circuit between the Drain and Gate because damage expands to the peripheral circuit of Q101.
This is due to a very high voltage through the Gate circuit which is composed of R109 and IC101.
You should change all of the parts listed as follows.
F101, Q101, R109, IC101

(D201)

If D201 is broken, the oscillation circuit in the power supply cannot operate. Check it with an electric tester.

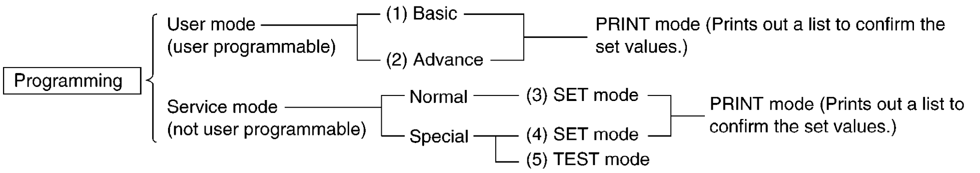
2.4. PROGRAMMING AND LISTS

The programming functions are used to program the various features and functions of the machine, and to test the machine.
This facilitates communication between the user and the service man while programming the unit.

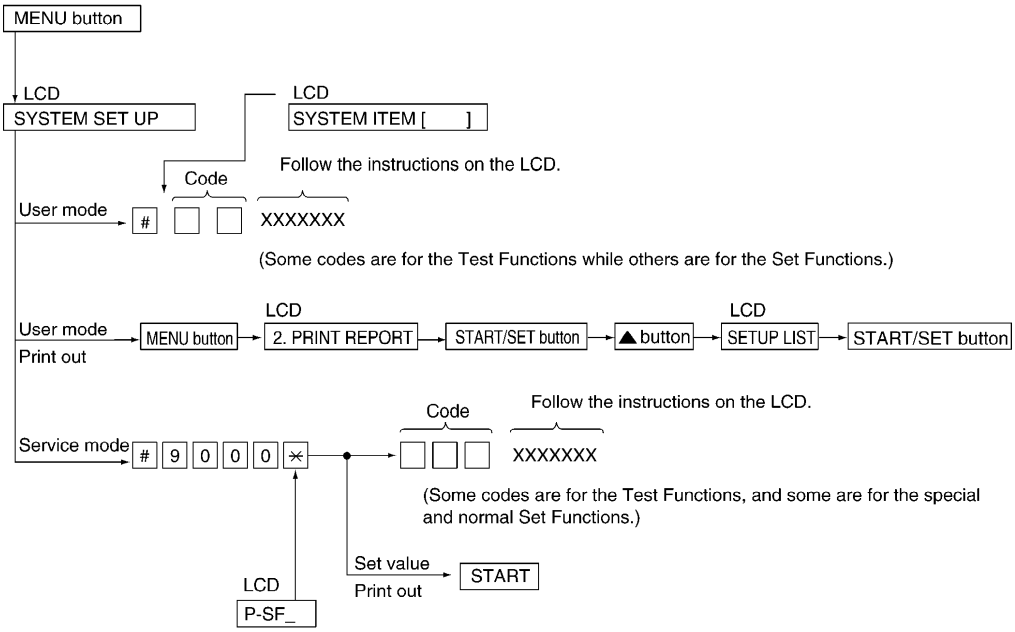
2.4.1. OPERATION

There are 2 basic categories of programming functions, the User Mode and the Service Mode. The Service Mode is further broken down into the normal and special programs. The normal programs are those listed in the Operating Instructions and are available to the user. The special programs are only those listed here and not displayed to the user. In both the User and Service Modes, there are Set Functions and Test Functions. The Set Functions are used to program various features and functions, and the Test Functions are used to test the various functions. The Set Functions are accessed by entering their code, changing the appropriate value, then pressing the SET key. The Test Functions are accessed by entering their code and pressing the key listed on the menu. While programming, to cancel any entry, press the STOP key.

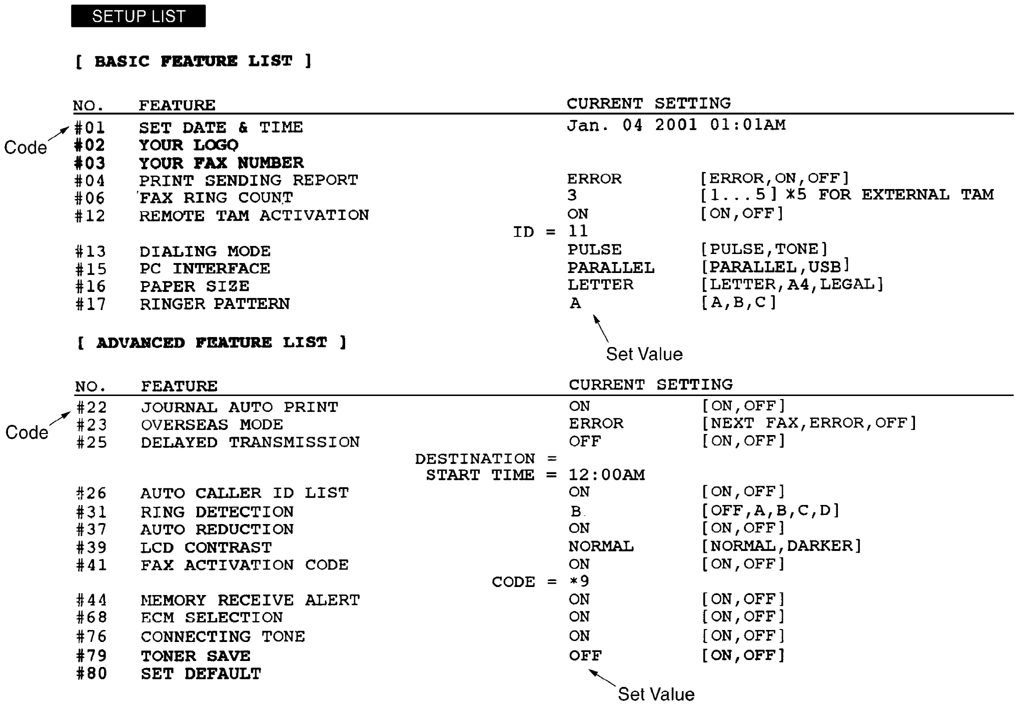
2.4.2. OPERATION FLOW


Programming
User mode
(user programmable)
(1) Basic
(2) Advance
PRINT mode (Prints out a list to confirm the set values.)
Service mode
(not user programmable)
Normal
Special
(3) SET mode
(4) SET mode
(5) TEST mode
PRINT mode (Prints out a list to confirm the set values.)

Operating Procedure


MENU button
LCD
SYSTEM SET UP
LCD
SYSTEM ITEM [ ]
Code
Follow the instructions on the LCD.
User mode
#
XXXXXXX
(Some codes are for the Test Functions while others are for the Set Functions.)
User mode
Print out
MENU button
LCD
2. PRINT REPORT
START/SET button
▲ button
LCD
SETUP LIST
START/SET button
Code
Follow the instructions on the LCD.
Service mode
# 9 0 0 0 ⁎
XXXXXXX
(Some codes are for the Test Functions, and some are for the special and normal Set Functions.)
Set value
Print out
START
LCD
P-SF_

2.4.3. USER MODE (The list below is an example of the SYSTEM SETUP LIST the unit prints out.)


SETUP LIST
Code
Set Value
Code
Set Value

```
[ BASIC FEATURE LIST ]

NO.    FEATURE                               CURRENT SETTING
#01    SET DATE & TIME                       Jan. 04 2001 01:01AM
#02    YOUR LOGO
#03    YOUR FAX NUMBER
#04    PRINT SENDING REPORT                  ERROR        [ERROR,ON,OFF]
#06    FAX RING COUNT                        3            [1...5] *5 FOR EXTERNAL TAM
#12    REMOTE TAM ACTIVATION                 ON           [ON,OFF]
                                        ID = 11
#13    DIALING MODE                          PULSE        [PULSE,TONE]
#15    PC INTERFACE                          PARALLEL     [PARALLEL,USB]
#16    PAPER SIZE                            LETTER       [LETTER,A4,LEGAL]
#17    RINGER PATTERN                        A            [A,B,C]

[ ADVANCED FEATURE LIST ]

NO.    FEATURE                               CURRENT SETTING
#22    JOURNAL AUTO PRINT                    ON           [ON,OFF]
#23    OVERSEAS MODE                         ERROR        [NEXT FAX,ERROR,OFF]
#25    DELAYED TRANSMISSION                  OFF          [ON,OFF]
                               DESTINATION =
                                START TIME = 12:00AM
#26    AUTO CALLER ID LIST                   ON           [ON,OFF]
#31    RING DETECTION                        B            [OFF,A,B,C,D]
#37    AUTO REDUCTION                        ON           [ON,OFF]
#39    LCD CONTRAST                          NORMAL       [NORMAL,DARKER]
#41    FAX ACTIVATION CODE                   ON           [ON,OFF]
                                      CODE = *9
#44    MEMORY RECEIVE ALERT                  ON           [ON,OFF]
#68    ECM SELECTION                         ON           [ON,OFF]
#76    CONNECTING TONE                       ON           [ON,OFF]
#79    TONER SAVE                            OFF          [ON,OFF]
#80    SET DEFAULT
```

Note:

The above values are the default values.

2.4.4. SERVICE FUNCTION TABLE

Code	Function	Set Value	Effective Range	Default	Remarks
501	Pause time set	X 100 msec	001~600	030	----------
502	Flash time	X 10 ms	01~99	70	----------
503	Dial speed select	1:10 pps 2: 20 pps	1, 2	1	----------
520	CED frequency select	1:2100 Hz 2:1100 Hz	1, 2	1	See Symptom/Countermeasu for long distance and internat calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE O INTERNATIONL COMMUNICA ().
521	International mode select	1:ON 2: OFF	1, 2	1	See Symptom/Countermeasu for long distance and internat calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE O INTERNATIONL COMMUNICA ().
522	Auto standby select	1:ON 2: OFF	1, 2	1	The resolution reverts to the when transmission is comple
523	Receive equalizer select	1: 0 km / 2: 1.8 km / 3: 3.6 km / 4: 7.2 km	1~4	1	Set RX equalizer to automatic
524	Transmission equalizer select	1: 0 km / 2: 1.8 km / 3: 3.6 km / 4: 7.2 km	1~4	1	
550	Memory clear: To reset the value to the default one, except the top margin (853) and left margin (854).				"START" input
551	ROM check				See TEST FUNCTIONS().
552	DTMF single tone test	1:ON 2: OFF	1, 2	2	See TEST FUNCTIONS().
553	Monitor on FAX communication select	1:OFF 2: PHASE B 3 :ALL	1~3	1	Sets whether to monitor the li signal with the unit's speaker FAX communication or not.
554	Modem test				See TEST FUNCTIONS().
555	Scan check				See TEST FUNCTIONS().
556	Motor test			0	See TEST FUNCTIONS().

Code	Function	Set Value	Effective Range	Default	Remarks
557	LED test				See TEST FUNCTIONS().
558	LCD test				See TEST FUNCTIONS().
561	KEY test				See TEST FUNCTIONS().
570	BREAK % select	1:61% 2: 67%	1, 2	1	Sets the % break of pulse dial according PBX.
573	Remote turn-on ring number set	X number of rings	01~99	10	Sets the number of rings befo unit starts to receive a docum the TEL mode.
590	FAX auto redial time set	X number of times	00~99	2	Selects the number of redial t during FAX communication (including the first dial).
591	FAX auto redial time disconnection time set	X second	001~999	065	Sets the FAX redial interval d FAX communication.
592	CNG transmit select	1:OFF / 2: ALL / 3: AUTO	1~3	2	Lets you select the CNG outp during FAX transmission. AL is output at phase A. AUTO: C output only when automatic d is performed. OFF: CNG id no at phase A. Refer to SOMETI THERE IS A TRANSMIT PRO
593	Time between CED and 300bps	1:75 msec / 2:500 msec / 3:1 sec	1~3	1	See Symptom/Countermeasu for long distance and internat calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE O INTERNATIONL COMMUNICA (). Refer to RECEIVE PROBLE
594	Overseas DIS detection select	1:detects at the 1st time / 2: detects at the 2st time	1, 2	1	See Symptom/Countermeasu for long distance and internat calls in THE UNIT CAN COPY, CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE O INTERNATIONL COMMUNICA (). Refer to SOMETIME THERE TRANSMIT PROBLEM().
595	Receive error limit value set	1: 5% / 2: 10% / 3: 15% / 4: 20%	1~4	2	If the number of errors during transmission exceeds this val sending side terminates the c
596	Transmit level set	X dBm	- 15~00	10	Selects the FAX transmission Refer to SOMETIME THERE I TRANSMIT PROBLEM ()and RECEIVE PROBLEM ().

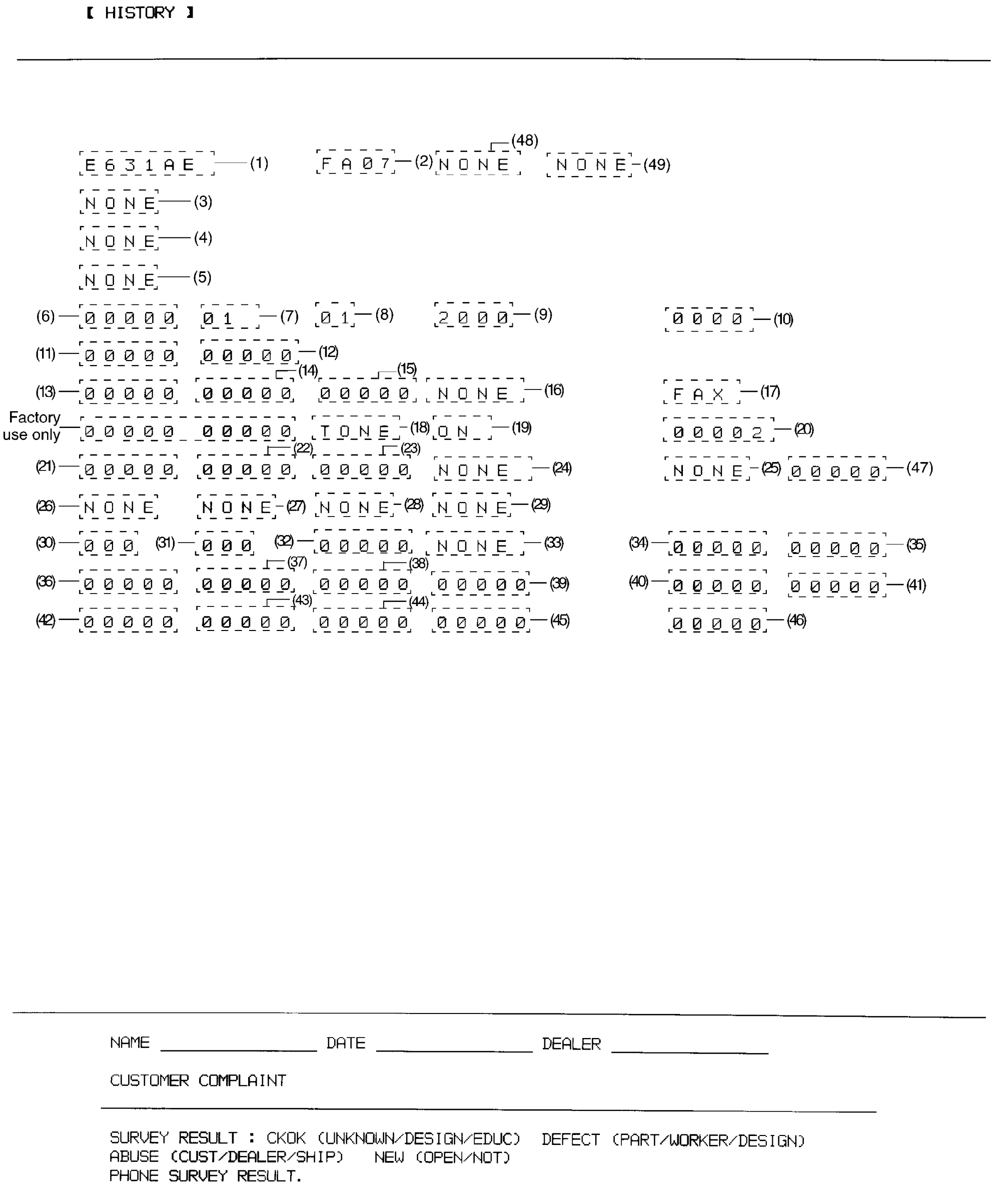
Code	Function	Set Value	Effective Range	Default	Remarks
598	Receiving sensitivity	01= -01 dBm	00~48	43	Used when there is an error p Refer to THE UNIT CAN COPY CANNOT EITHER TRANSMIT/ RECEIVE LONG DISTANCE O INTERNATIONL COMMUNICA
599	ECM frame size	1:256 2:64	1, 2	1	----------
651	Write system program into the Flash Rom with a tool.				See the parts number of the t Refer to FIXTURES AND TOO The tool includes the operatir manual for writing program.
717	Transmit speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4:7200BPS / 5: 4800BPS / 6:2400BPS	1~6	1	Adjusts the speed to start trai during FAX transmission. Ref SOMETIME THERE IS A TRAN PROBLEM () and THE UNIT C COPY, BUT CANNOT EITHER TRANSMIT/RECEIVE LONG DISTANCE OR INTERNATION COMMUNICATIONS ().
718	Receive speed selection	1: 14400BPS / 2: 12000BPS / 3: 9600BPS / 4:7200BPS / 5: 4800BPS / 6:2400BPS	1~6	1	Adjusts the speed to start trai during FAX reception. Refer t RECEIVE PROBLEM() and
771	T1 timer	1:35 sec / 2 :60 sec	1, 2	1	Sets a higher value when the response from the other party more time during FAX transm
774	T4 timer	× 100 sec	00~99	00	Use this function when delay in the line and communicatio Mobile comm) does not work
815	Sensor & Vox check				See TEST FUNCTIONS ().
852	Print test pattern				See TEST FUNCTIONS ().
853	Top margin		1~5	3	----------
854	Left margin		1~7	4	See LSU (Laser Scanning Uni SECTION ().
880	History list				See HISTORY ().
881	Journal 2 list				See PRINTOUT EXAMPLE ().
882	Journal 3 list				See PRINTOUT EXAMPLE ().

2.4.5. SERVICE MODE SETTINGS (Example of a printed out list)

```
      ↗501 PAUSE TIME           =  030*100ms     [001...600]*100ms
Code  502 FLASH TIME            =  70*10ms       [01...99]*10ms
      503 DIAL SPEED            =  10pps         [1=10      2=20]pps
      520 CED FREQUENCY         =  2100Hz        [1=2100    2=1100]Hz
      521 INTERNATIONAL MODE    =  ON            [1=ON      2=OFF]
      522 AUTO STANDBY          =  ON            [1=ON      2=OFF]
      523 RX EQUALIZER          =  0.0Km         [1=0.0     2=1.8     3=3.6     4=7.2]Km
      524 TX EQUALIZER          =  0.0Km         [1=0.0     2=1.8     3=3.6     4=7.2]Km
      853 TOP MARGIN            =  3*0.5mm       [1...5]*0.5mm
      854 LEFT MARGIN           =  4*0.677mm     [1...7]*0.677mm
                                    ↖Set Value


      [ SPECIAL SERVICE SETTINGS ]

      ↗552   553   570   573   590   591   592   593   594   595   596   598   599
Code    2     1     1    10    02   065     2     1     1     2    10    43     1
                                           ↖Set Value
       717   718   771   774
         1     1     1    00


      USAGE TIME = 0 HOURS
```

Note:
The above values are the default values.

2.4.6. HISTORY



```
[ HISTORY ]

E631AE ——(1)      FA07 —(2) NONE (48)   NONE —(49)
NONE ——(3)
NONE ——(4)
NONE ——(5)
(6)—00000   01 —(7)   01 —(8)   2000 —(9)          0000 —(10)
(11)—00000   00000 —(12)
(13)—00000   00000 (14)   00000 (15)   NONE —(16)   FAX —(17)
Factory
use only—00000   00000   TONE —(18) ON —(19)        00002 —(20)
(21)—00000   00000 (22)   00000 (23)   NONE —(24)   NONE —(25) 00000 —(47)
(26)—NONE   NONE —(27)   NONE —(28)   NONE —(29)
(30)—000   (31)—000   (32)—00000   NONE —(33)   (34)—00000   00000 —(35)
(36)—00000   00000 (37)   00000 (38)   00000 —(39)   (40)—00000   00000 —(41)
(42)—00000   00000 (43)   00000 (44)   00000 —(45)   00000 —(46)

NAME ______________ DATE ______________ DEALER ______________

CUSTOMER COMPLAINT
________________________________________________________________

SURVEY RESULT : CKOK (UNKNOWN/DESIGN/EDUC)  DEFECT (PART/WORKER/DESIGN)
ABUSE (CUST/DEALER/SHIP)   NEW (OPEN/NOT)
PHONE SURVEY RESULT.
```

Note:

See the following descriptions of this report. Item No. (1) ~ (49) are corresponding to the listed items in DESCRIPTIONS OF THE HISTORY REPORT().

2.4.6.1. DESCRIPTIONS OF THE HISTORY REPORT

(1) ROM VERSION

FLASH ROM version

(2) SUM

FLASH ROM internal data calculation.

(3) YOUR LOGO

The user logo recorded in the unit. If it is not recorded, NONE will be displayed.

(4) YOUR TELEPHONE NUMBER

The user telephone number recorded in the unit. If it is not recorded, NONE will be displayed.

(5) FAX PAGER NUMBER

If you program a pager number into the unit, the pager number will be displayed here.

(6) FACTORY - CUSTOMER

This shows how many days from factory production until the user turns ON the unit.

(7) MONTH

The shows the very first month, date, year and time set by the user after they purchased the unit.

(8) DAY

The shows the very first month, date, year and time set by the user after they purchased the unit.

(9) YEAR

The shows the very first month, date, year and time set by the user after they purchased the unit.

(10) TIME

The shows the very first month, date, year and time set by the user after they purchased the unit.

(11) USAGE TIME

The amount of time the unit has been powered ON.

(12) FACTORY - NOW

This shows how many days from factory production until the user prints out this history list.

(13) TEL MODE

The amount of time the TEL mode setting was used.

(14) FAX MODE

The amount of time the FAX mode setting was used.

(15) TEL/FAX MODE

The amount of time the TEL/FAX mode setting was used.

(16) ANS/FAX MODE

The amount of time the ANS/FAX mode setting was used.

(17) FINAL RECEIVE MODE

The last set receiving mode by the user.

(18) TONE/PULSE SELECTION

The most recently used setting used, either TONE or PULSE.

(19) RECEIVE REDUCTION

The compression rate when receiving.

(20) SETTING NO. OF DIRECTORY

The recorded directory stations (one touch and JOG DIAL).

(21) NUMBER OF COPY

The number of pages copied.

(22) NUMBER OF RECEIVE

The number of pages received.

(23) NUMBER OF SENDING

The number of pages sent.

(24) NUMBER OF CALLER ID

The number of times Caller ID was received.

(25) NUM(BER OF RECORDING MESSAGE

The number of messages recorded in TAM.

(26) NUMBER OF PC SCAN

The number of times multifunction was used for the Scanner. (The number of pages scanned. If the unit does not have a PC interface, NONE will be printed.)

(27) NUMBER OF PC-PRINT

The number of times multifunction was used for the Printer. (The number of pages printed. If the unit does not have a PC interface, NONE will be printed.)

(28) NUMBER OF RECEIVING TO PC

The number of times received in the PC through the FAX serial interface (RS232C). (The number of pages received. If the unit does not have a PC interface, NONE will be printed.)

(29) NUMBER OF SENDING FROM PC

The number of times transmitted from the PC through the FAX serial interface (RS232C). (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(30) NUMBER OF PRINTING WARNING LIST

The number of warning lists printed until now.

(31) NUMBER OF PRINTING HELP

The number of help lists printed until now.

(32) NUMBER OF DIVIDED PRINTING IN FAX RECEPTION

The number of faxes received that were divided into more than one sheet since the unit was purchased.

(33) DETECTION OF RS232C

When the fax and PC serial cable (RS232C) are connected and the signal is received correctly, COMPLETE will be printed. For models without a PC interface or when there is a PC interface but the signal cannot be received between the fax and PC, INCOMPLETE will be printed. (The number of pages transmitted. If the unit does not have a PC interface, NONE will be printed.)

(34) NO. OF IQ-FAX LOADING -OK:

(35)NO. OF IQ-FAX LOADING -NG:

You may not be able to use IQ-FAX if the special subscriber information is not loaded from the IQ-FAX center before use. Depending on the conditions of the communication line, it may not be completed in one time, so RETRIED will be performed. The number of OK and NG IQ-FAX loadings will be printed.

(36) FAX MODE

Means the unit received a fax message in the FAX mode.

(37) MAN RCV

Means the unit received a fax message by manual operation.

(38) FRN RCV

Means the unit received a fax message by friendly signal detection.

(39) VOX

Means the unit detected silence or no voice.

(40) RMT DTMF

Means the unit detected DTMF (Remote Fax activation code) entered remotely.

(41) PAL DTMF

Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.

(42) TURN-ON

Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)

(43) TIME OUT

Means the unit started to receive after Ring Time Out in the EXT-TAM or TEL/FAX mode.

(44) IDENT

Means the unit detected Ring Detection.

(45) CNG OGM

Means the unit detected the CNG while it was sending the Dummy Ring Back Tone in the TEL/FAX mode, or while answering a call in the EXT-TAM mode. Or means the unit detected the CNG while it was sending the OGM in the ANS/FAX mode.

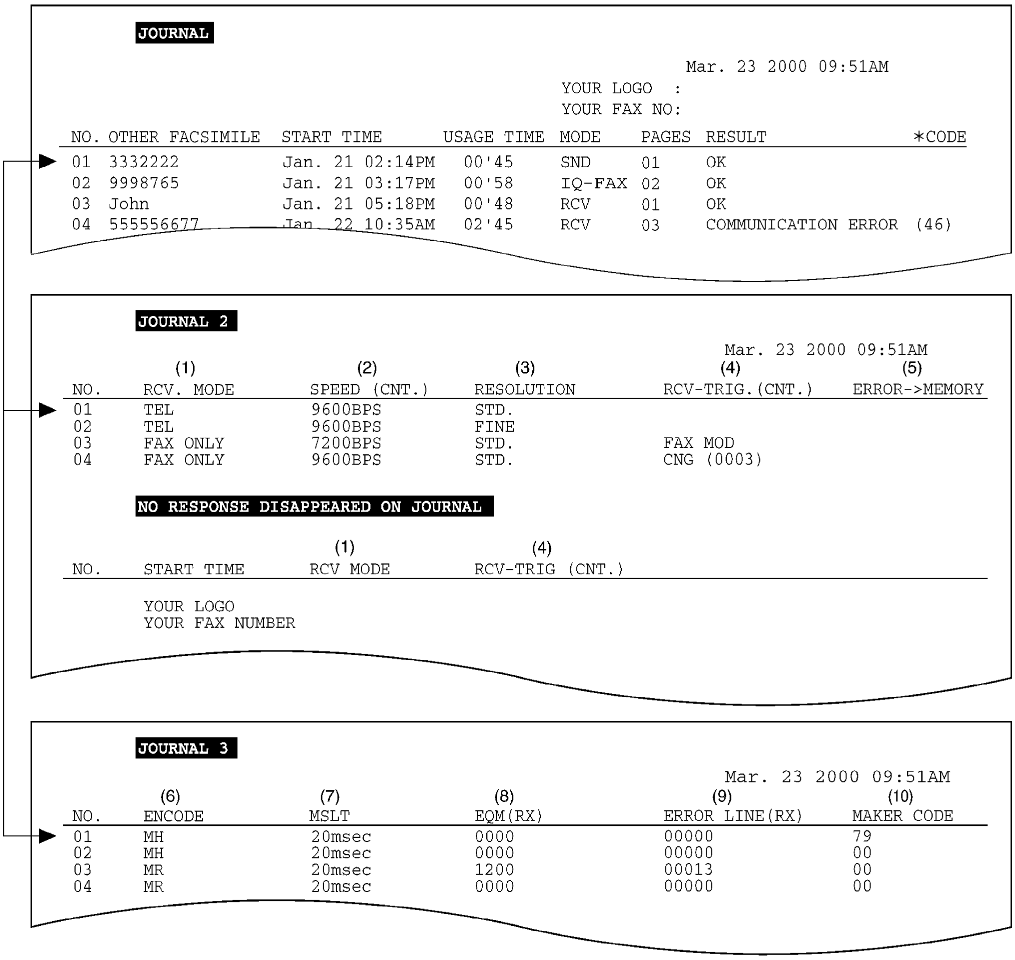
(46) CNG ICM

Means the unit detected the CNG while it was recording the ICM in the ANS/FAX mode.

(47) NUMBER OF IQ-FAX PAGES TRANSMITTED
(48) Not Used
(49) Not Used

2.4.7. SPECIAL SERVICE JOURNAL REPORTS

Journal 2 and Journal 3 shown below, which are special journals giving the additional detailed information about the latest 35 communications, can be printed by Service Code 881 or 882. Remote printing function for the journal reports (JOURNAL, JOURNAL 2 and JOURNAL 3) is also available for service technicians. (Refer to REMOTE PROGRAMMING().) The JOURNAL report only gives you basic information about a communication, but the other two journal reports provide different information on the same item (communication).



```
JOURNAL

                                               Mar. 23 2000 09:51AM
                                         YOUR LOGO   :
                                         YOUR FAX NO:

NO. OTHER FACSIMILE  START TIME      USAGE TIME  MODE    PAGES  RESULT                  *CODE
01  3332222          Jan. 21 02:14PM   00'45     SND     01     OK
02  9998765          Jan. 21 03:17PM   00'58     IQ-FAX  02     OK
03  John             Jan. 21 05:18PM   00'48     RCV     01     OK
04  555556677        Jan. 22 10:35AM   02'45     RCV     03     COMMUNICATION ERROR  (46)
```

```
JOURNAL 2
                                                        Mar. 23 2000 09:51AM
          (1)              (2)               (3)                   (4)                (5)
NO.   RCV. MODE        SPEED (CNT.)      RESOLUTION           RCV-TRIG.(CNT.)     ERROR->MEMORY
01    TEL              9600BPS           STD.
02    TEL              9600BPS           FINE
03    FAX ONLY         7200BPS           STD.                 FAX MOD
04    FAX ONLY         9600BPS           STD.                 CNG (0003)

NO RESPONSE DISAPPEARED ON JOURNAL

                           (1)                 (4)
NO.   START TIME       RCV MODE          RCV-TRIG (CNT.)

      YOUR LOGO
      YOUR FAX NUMBER
```

```
JOURNAL 3
                                                        Mar. 23 2000 09:51AM
         (6)              (7)               (8)                  (9)               (10)
NO.   ENCODE           MSLT              EQM(RX)              ERROR LINE(RX)      MAKER CODE
01    MH               20msec            0000                 00000               79
02    MH               20msec            0000                 00000               00
03    MR               20msec            1200                 00013               00
04    MR               20msec            0000                 00000               00
```

HOW TO READ JOURNAL REPORTS:
Example:

1. Look at NO. 01 in the JOURNAL. If you want to know about the details about that item, see NO. 01 in the JOURNAL 2 and the

JOURNAL 3. You can get the following information.
* MODE: Fax transmission
* RCV. MODE: TEL
* TX SPEED: 9.6 kbps
* RESOLUTION: standard
* ENCODE: MH
* MAKER CODE: 79

2. Look at NO. 04 in the JOURNAL 2. CNG (0003) indicates that the CNG signal has been received three times since the purchase date.

For further details, see JOURNAL 2 and JOURNAL 3.

2.4.7.1. JOURNAL 2

Refer to JOURNAL 2 in PRINTOUT EXAMPLE().
Journal 2 displays the additional detailed information about the last 35 communications.
Descriptions:
(1) RCV. MODE
Indicates which receive mode the unit was in when the unit received a fax message.
This information is also displayed when the unit transmitted a fax message.
(2) SPEED
Indicates the speed of the communication. If multiple pages are transmitted or received, it indicates the last page’s communication speed. If there is a communication error, "?" is displayed.
(3) RESOLUTION
Indicates the resolution of the communication. If multiple pages are transmitted or received, it indicates the last page’s resolution. If there is a communication error, "?" is displayed.
(4) RCV-TRIG. (CNT.)
Indicates the trigger that causes the unit to switch to the fax receive mode. The available options are listed in JOURNAL 2 in PRINTOUT EXAMPLE(). The values in parentheses indicate how many times the trigger has been used. (For example, "0003" means three times.)

No.	Display	Function
1	FAX MODE	Means the unit received a fax message in the FAX mode.
2	MAN RCV	Means the unit received a fax message by manual operation.
3	RMT DTMF	Means the unit detected DTMF (Remote Fax activation code) entered remotely.
4	PAL DTMF	Means the unit detected DTMF (Remote Fax activation code) entered by a parallel connected telephone.
5	TURN-ON	Means the unit started to receive after 15 rings. (Remote Turn On: Service Code #573)
6	IDENT	Means the unit detected Ring Detection.

(5) ERROR → MEMORY

Indicates the reason why the unit received a fax message in memory.

If you look at No.11 in the JOURNAL 2 in PRINTOUT EXAMPLE(), it shows the fax message was received in memory due to "PAPER OUT" error.

[NO RESPONSE DISAPPEARED ON JOURNAL]

The "NO RESPONSE DISAPPEARED ON JOURNAL" displays the information about the last 10 communications terminated by "No Response". (Some of the communications terminated by "No Response" were not displayed in the JOURNAL.)

When a fax transmission cannot be performed because the other party’s unit is set to the TEL mode, "No response" will be printed.

2.4.7.2. JOURNAL 3

Refer to JOURNAL 3 in PRINTOUT EXAMPLE().

Description

(6) ENCODE

Compression Code: MH/MR/MMR

(7) MSLT

MSLT means Minimum Scan Line Time. Used only at the factory.

(8) EQM

EQM means Eye Quality Monitor. Used only at the factory.

(9) ERROR LINE (RX)

When an error occurs while receiving a fax, this shows the number of error lines.

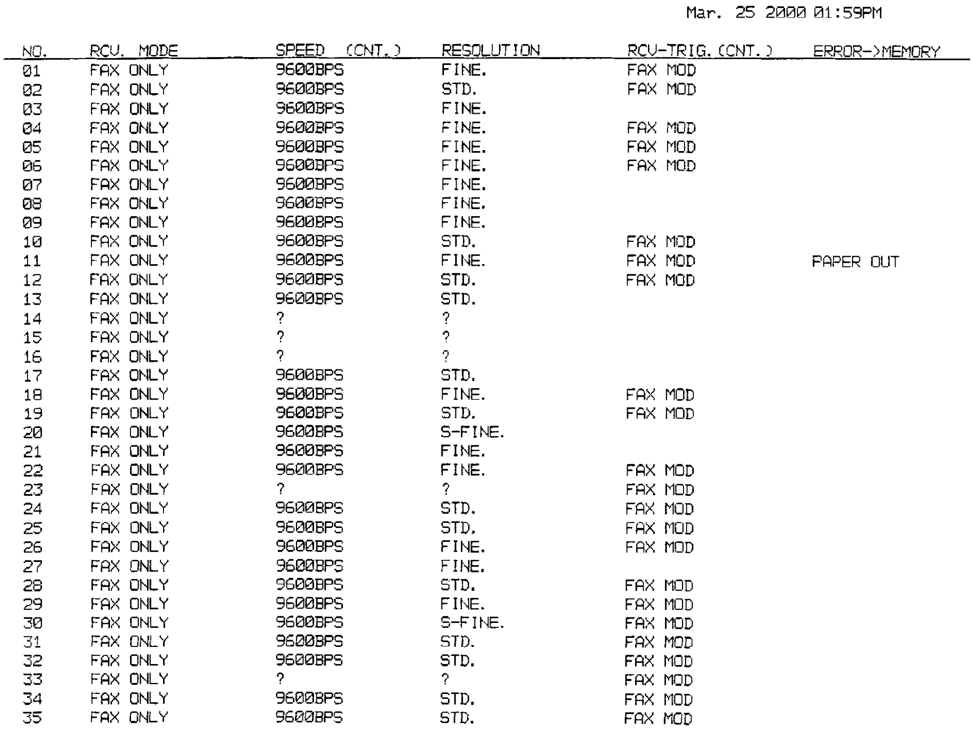
(10) MAKER CODE

This shows a 2 digit code of the other party's fax machine brand.

0E: "KX" model
00: Unknown
79: "UF" model
19: "Xerox" model

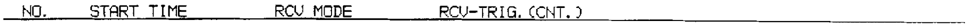
2.4.7.3. PRINTOUT EXAMPLE

JOURNAL2



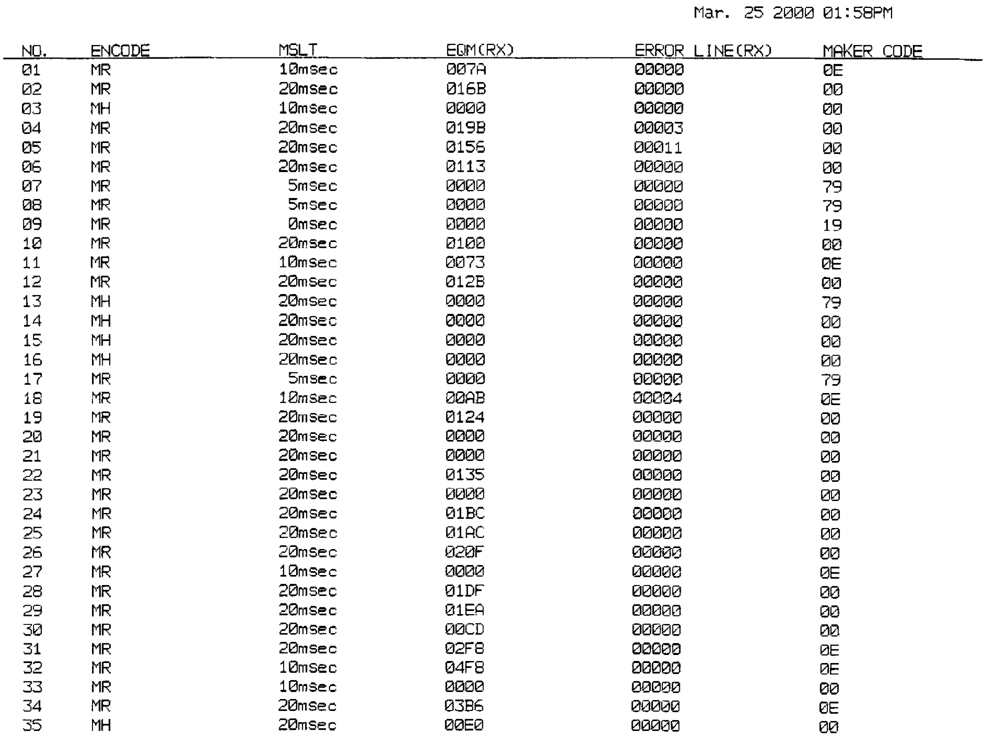
```
                                                                 Mar. 25 2000 01:59PM

 NO.    RCV. MODE             SPEED  (CNT.)     RESOLUTION            RCV-TRIG.(CNT.)     ERROR->MEMORY
 01     FAX ONLY              9600BPS           FINE.                 FAX MOD
 02     FAX ONLY              9600BPS           STD.                  FAX MOD
 03     FAX ONLY              9600BPS           FINE.
 04     FAX ONLY              9600BPS           FINE.                 FAX MOD
 05     FAX ONLY              9600BPS           FINE.                 FAX MOD
 06     FAX ONLY              9600BPS           FINE.                 FAX MOD
 07     FAX ONLY              9600BPS           FINE.
 08     FAX ONLY              9600BPS           FINE.
 09     FAX ONLY              9600BPS           FINE.
 10     FAX ONLY              9600BPS           STD.                  FAX MOD
 11     FAX ONLY              9600BPS           FINE.                 FAX MOD             PAPER OUT
 12     FAX ONLY              9600BPS           STD.                  FAX MOD
 13     FAX ONLY              9600BPS           STD.
 14     FAX ONLY              ?                 ?
 15     FAX ONLY              ?                 ?
 16     FAX ONLY              ?                 ?
 17     FAX ONLY              9600BPS           STD.
 18     FAX ONLY              9600BPS           FINE.                 FAX MOD
 19     FAX ONLY              9600BPS           STD.                  FAX MOD
 20     FAX ONLY              9600BPS           S-FINE.
 21     FAX ONLY              9600BPS           FINE.
 22     FAX ONLY              9600BPS           FINE.                 FAX MOD
 23     FAX ONLY              ?                 ?                     FAX MOD
 24     FAX ONLY              9600BPS           STD.                  FAX MOD
 25     FAX ONLY              9600BPS           STD.                  FAX MOD
 26     FAX ONLY              9600BPS           FINE.                 FAX MOD
 27     FAX ONLY              9600BPS           FINE.
 28     FAX ONLY              9600BPS           STD.                  FAX MOD
 29     FAX ONLY              9600BPS           FINE.                 FAX MOD
 30     FAX ONLY              9600BPS           S-FINE.               FAX MOD
 31     FAX ONLY              9600BPS           STD.                  FAX MOD
 32     FAX ONLY              9600BPS           STD.                  FAX MOD
 33     FAX ONLY              ?                 ?                     FAX MOD
 34     FAX ONLY              9600BPS           STD.                  FAX MOD
 35     FAX ONLY              9600BPS           STD.                  FAX MOD
```

NO RESPONSE DISAPPEARED ON JOURNAL



```
 NO.    START TIME            RCV MODE          RCV-TRIG.(CNT.)
```

JOURNAL3



```
                                                                 Mar. 25 2000 01:58PM

NO.    ENCODE            MSLT          EQM(RX)           ERROR LINE(RX)    MAKER CODE
01     MR                10msec        007A              00000             0E
02     MR                20msec        016B              00000             00
03     MH                10msec        0000              00000             00
04     MR                20msec        019B              00003             00
05     MR                20msec        0156              00011             00
06     MR                20msec        0113              00000             00
07     MR                 5msec        0000              00000             79
08     MR                 5msec        0000              00000             79
09     MR                 0msec        0000              00000             19
10     MR                20msec        0100              00000             00
11     MR                10msec        0073              00000             0E
12     MR                20msec        012B              00000             00
13     MH                20msec        0000              00000             79
14     MH                20msec        0000              00000             00
15     MH                20msec        0000              00000             00
16     MH                20msec        0000              00000             00
17     MR                 5msec        0000              00000             79
18     MR                10msec        00AB              00004             0E
19     MR                20msec        0124              00000             00
20     MR                20msec        0000              00000             00
21     MR                20msec        0000              00000             00
22     MR                20msec        0135              00000             00
23     MR                20msec        0000              00000             00
24     MR                20msec        01BC              00000             00
25     MR                20msec        01AC              00000             00
26     MR                20msec        020F              00000             00
27     MR                10msec        0000              00000             0E
28     MR                20msec        01DF              00000             00
29     MR                20msec        01EA              00000             00
30     MR                20msec        00CD              00000             00
31     MR                20msec        02F8              00000             0E
32     MR                10msec        04F8              00000             0E
33     MR                10msec        0000              00000             00
34     MR                20msec        03B6              00000             0E
35     MH                20msec        00E0              00000             00
```

2.5. TEST FUNCTIONS

The codes listed below can be used to perform simple checks of some of the unit’s functions. When complaints are received from customers, they provide an effective tool for identifying the locations and causes of malfunctions.

Test Mode	Type of Mode	Code Operation after code input	Function
MOTOR TEST	Service Mode	“5” “5” “6” START	0: Recording paper feed 1: Document feed (STANDARD) 2: Document feed (FINE) 3: Document feed (SUPER FINE)
MODEM TEST	Service Mode	“5” “5” “4” START	Telephone line circuit is connected automatically, the following signals on the circuit line. 1) OFF 2) 14400bps 3) 12000bps 4) 9600bps 5)720 6) 4800bps 7) 2400bps 8) 300bps 9) 2100Hz 10)11
ROM CHECK	Service Mode	“5” “5” “1” START	Indicates the version and checks the sum of the F
SCAN CHECK	Service Mode	“5” “5” “5” START	Turns on the LEDs of the CIS and operates the rea systems.
LCD CHECK	Service Mode	“5” “5” “8” START	Checks the LCD indication. Illuminates all the dots to check if they are norma
DTMF SINGLE TEST	Service Mode	“5” “5” “2” 1....ON 2....OFF	Outputs the DTMF as single tones. Used to check frequencies of the individual DTMF tones. Refer t SINGLE TONE TRANSMIT SELECTION ().
LED CHECK	Service Mode	“5” “5” “7” START	All LEDs above the operation panel board flash o or are illuminated.
KEY CHECK	Service Mode	“5” “6” “1” START (any key)	Checks the button operation. Indicates the button code on the LCD while the bu pressed. Refer to BUTTON CODE TABLE ().
FACTORY SET	Service Mode	“5” “5” “0” START	Clears the memory where the users can store dat
High Voltage Power Supply Board CHECK	Service Mode	“6” “2” “8” START	Refer to HIGH VOLTAGE VALUE CHECK POINT ()

Test Mode	Type of Mode	Code Operation after code input	Function
SENSOR CHECK & VOX CHECK	Service Mode	“8” “1” “5” START	First of all, press the copy button, and confirm th ON/OFF. For each sensor’s operation , refer to SENSORS SWITCHES SECTION (). [D S C P R E D T * F * * * * V] : LCD DISPLAY D: Document sensor :When a document is insert. S: Scanner read Pos. :When a document is insert. C: Cover of Printer :When the top cover is open. P: Paper exist :When recording paper exists. R: Pick up paper :When recording paper exists. E: Exit sensor on :When exist sensor is on. D: Developer exist T: Toner exist *: None

			*: None F: Temperature of fuser unit (2 digits) :Refer to HEAT LAMP CONTROL CIRCUIT (). *: None *: None *: None *: None V: Vox exist

Test Mode	Type of Mode	Code	Function
		Operation after code input	
PRINT TEST PATTERN	Service Mode	“8” “5” “2”	1. Press “852” then the SET key in the service mo 2. As “PATNO = ” is displayed on the LCD, enter t pattern No. and press the SET key. 3. When “No. = “ is displayed on the LCD, enter th number and press the SET key. (Press “00” for th printing.) 4. “MODE” is displayed on the LCD. Press “0” to printing or press “1” to go to the next screen. 5. When “1” is pressed at MODE, “INTVL = “ is dis the LCD. Enter the printing interval (00~99 sec). 6. The printing repeats the designated number of the programmed printing intervals.
		START	

Note:

The numbers in the boxes (XXX) indicate the keys to be input for the various test modes.

2.5.1. HIGH VOLTAGE VALUE CHECK POINT

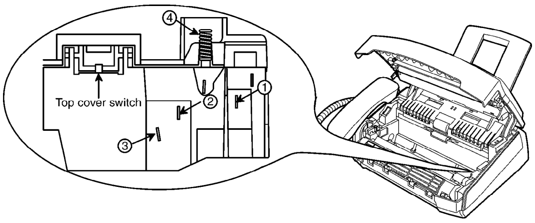
Measurement Procedure

1. Open the TOP cover.
2. Remove the developing unit, if it is equipped.
3. Open the TOP cover, and turn ON the TOP cover SW.
   (Push the TOP cover SW with a sharp-tipped insulator or insert folded paper, etc. to the slit.)
4. The unit enters the service mode when the TOP cover is open, then push *628.
   (Don't push the START button.)
5. Touch the output terminals under test with the high voltage probes.
6. Push the START button.
   (This causes to output high voltage from each terminal, so be careful not to touch them. The sound "Pi Pi Pi" warns that the high voltage is outputting.)
7. When the measurement is finished, push the STOP button.
   (The high voltage output is stopped.)
8. Repeat the items No. 5~7 until the measurement is finished.
9. When the measurement is finished, turn OFF the TOP cover SW.

Output voltage of each terminal

No.	BIAS Name	Specified output voltage	The range of specified output vo
①	CHG (Charge)	-1200V	-1200V± 35V
②	DEV (Developing)	-350V	-350V± 15V
③	SUP (Supply)	-550V	-550V± 50V
④	TRA (Transfer)	-1200V	-1200V± 100V

*** As for the High Voltage test equipment, FLUKE 85 (MULTIMETER)+ HIOKI (HV PROBE 9014) or the equivalent should be used.**



2.5.2. DTMF SINGLE TONE TRANSMIT SELECTION

When set to ON (=1), the 12 keys and transmission frequencies are as shown.

key	High Frequency (Hz)	Key	Low Frequency (Hz)
"1"	697	"5"	1209
"2"	770	"6"	1336
"3"	852	"7"	1477
"4"	941	"8"	1633

When set to OFF (=2), the 12 keys and transmission frequencies are as shown.

High (Hz) Low (Hz)	1209	1336	1477
697	"1"	"2"	"3"
770	"4"	"5"	"6"
852	"7"	"8"	"9"
941	*	"0"	"#"

Note:

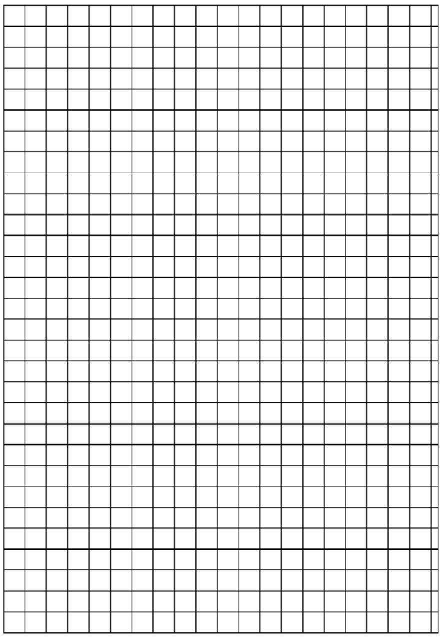
After performing this check, do not forget to turn the setting off. otherwise, dialing in DTMF signal will not work.

2.5.3. BUTTON CODE TABLE

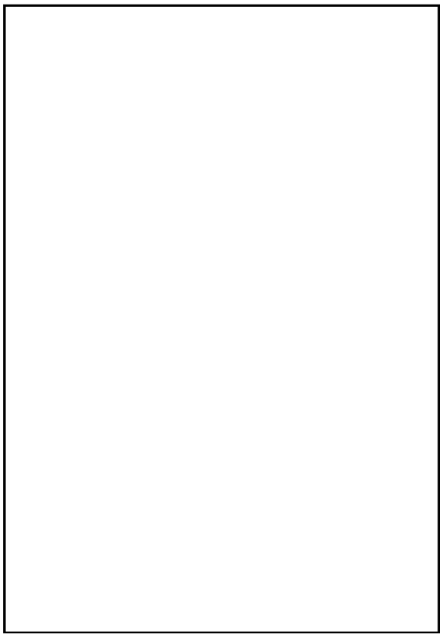
Code	Button Name	Code	Button Name	Code	Button Name
5D	RESOLUTION	33	3	58	QUICK SCAN START
43	START/SET	34	4	4F	JOG (FWD)
4D	LOWER	35	5	51	JOG (BACK)
41	COPY START	36	6	5F	COLLATE
54	MONITOR	37	7	59	PRINT (CALLER ID)
55	MUTE	38	8	48	BROADCAST 1
4E	AUTO ANSWER	39	9	49	BROADCAST 2
44	MENU	30	0	4A	MAUAL BROAD
53	HELP	3A	*	4B	STATION 4
45	DIRECTORY	3B	#	4C	STATION 5
47	▶ VOLUME (+)	52	REDIAL/PAUSE	00	NO INPUT
46	◀ VOLUME (—)	57	FLASH	—	STOP
31	1	5A	SEARCH (CALLER ID)		
32	2	60	NAME/TEL NO.		

2.5.4. PRINT TEST PATTERN

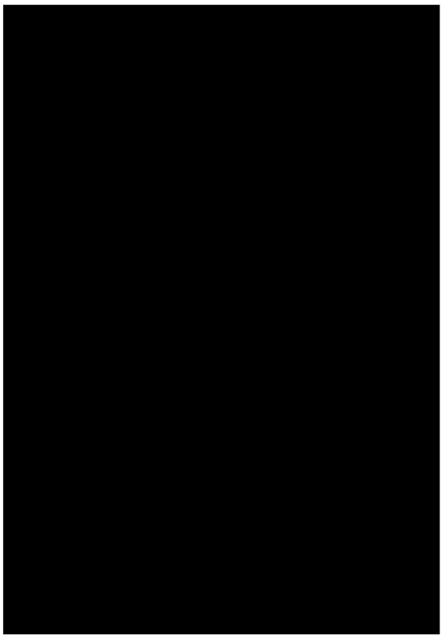
1. NO. 01



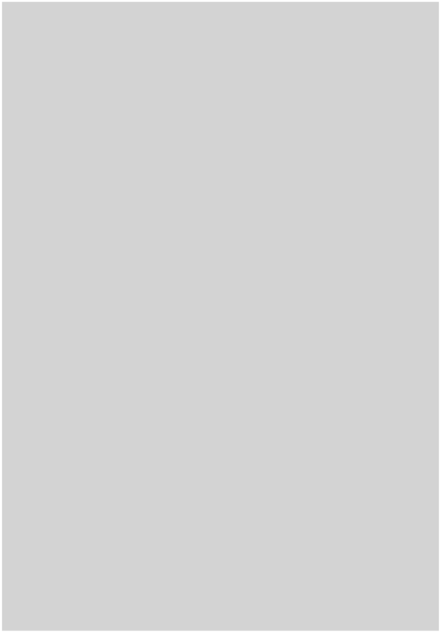
2. NO. 03



3. NO. 07



4. NO. 09



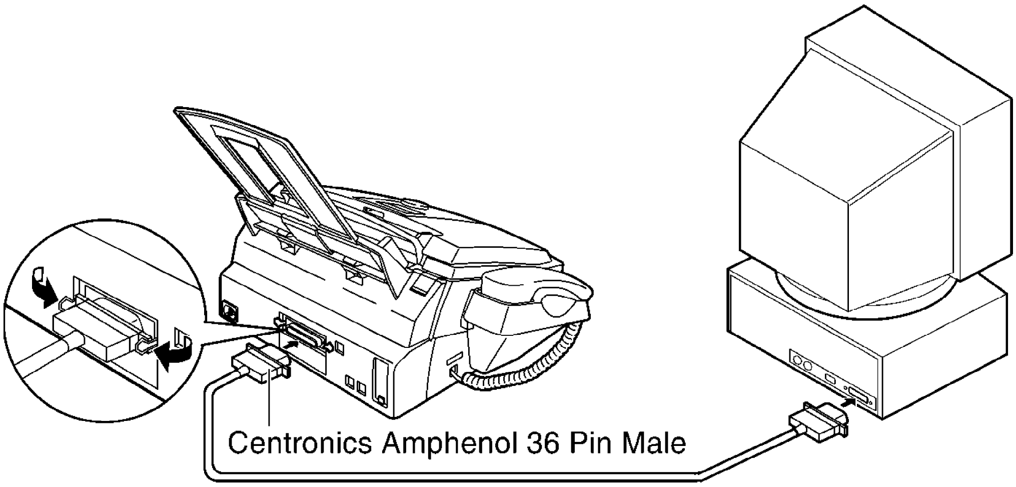
2.6. CONNECTING TO A COMPUTER

Panasonic Multi-Function Station enables your fax machine to carry out the following funtions:
— Printing on plain paper, transparencies, labels and envelopes
— Scanning documents and converting an image into text with Readiris OCR software

— Scanning from other Microsoft® Windos® applications that support TWAIN scanning
— Storing, editing or erasing entries in directories from your PC
— Programming the basic and advanced features from your PC
To run Multi-Function Station software, you need the following:

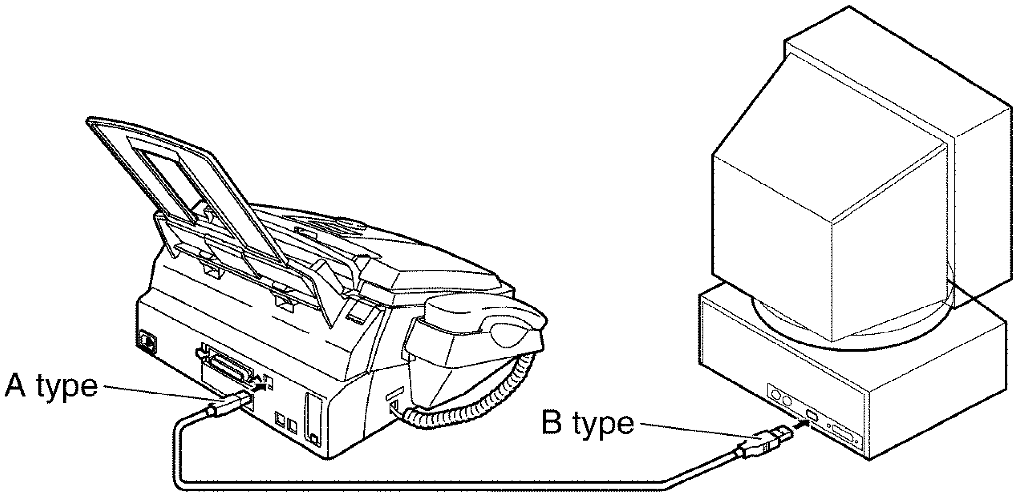
Compatible OS:	Windows 95/98/Me/2000	
CPU:	Windows 95/98:	Pentium 90 MHz or higher processor
	Windows Me:	Pentium 150 MHz or higher processor
	Windows 2000:	Pentium 166 MHz or higher processor
Memory minimum:	Windows 95/98:	24 MB (32 MB or more is recommended.)
	Windows Me:	32 MB (64 MB or more is recommended.)
	Windows 2000:	64 MB
Hard disk:	More than 40 MB available space	
Other:	Parallel (IEEE1284) port or USB port, and CD-ROM drive	

2.6.1. Using an IEEE1284 compliant parallel cable:



2.6.2. Using a USB cable: (Windows 95 does not apply for USB port)

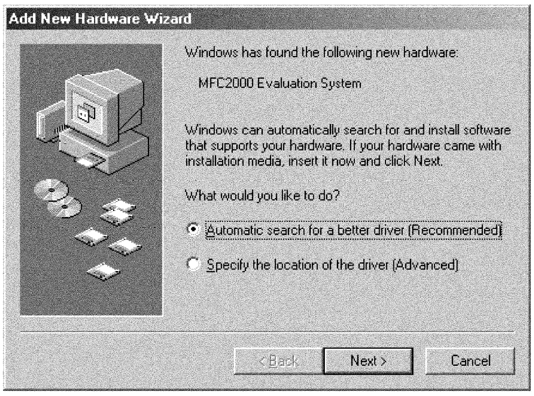
After connecting the USB cable, you must set the cable type to “USB” (feature #15)



2.7. INSTALLING PANASONIC MULTI-FUNCTION STATION SOFTWARE

1 Start Windows 95, Windows 98, Windows Me or Windows 2000 and close all applications.

- If you connect the fax machine to your computer beforehand, the following dialog box may appear. Click [Cancel] to close it.



Add New Hardware Wizard

Windows has found the following new hardware:

MFC2000 Evaluation System

Windows can automatically search for and install software that supports your hardware. If your hardware came with installation media, insert it now and click Next.

What would you like to do?

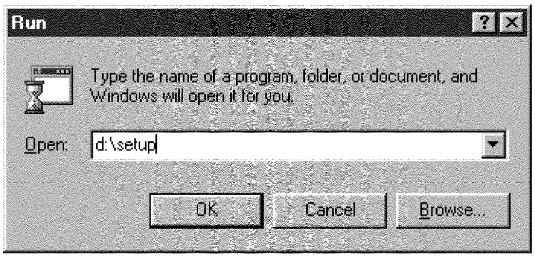
● Automatic search for a better driver (Recommended)

○ Specify the location of the driver (Advanced)

- You must be logged in as an administrator in Windows 2000.

2 Insert the included CD-ROM into your CD-ROM drive.

- The [Choose Setup Language] dialog box will appear. Select the desired language that you want to use with this software from the drop-down list. Click [OK].
  The installation will automatically start.
- If [Choose Setup Language] dialog box does not appear:
  The installation will automatically start.
- If the installation does not start automatically:
  Click [Start], choose [Run...]. Type “d:\setup” (where “d:” is the drive letter of your CD-ROM drive). Click [OK].
  (If you are not sure what the drive letter is for your CD-ROM drive, use Windows Explorer and look for the CD-ROM drive.)



Run

Type the name of a program, folder, or document, and Windows will open it for you.

Open: d:\setup

- 3 The installation will start.

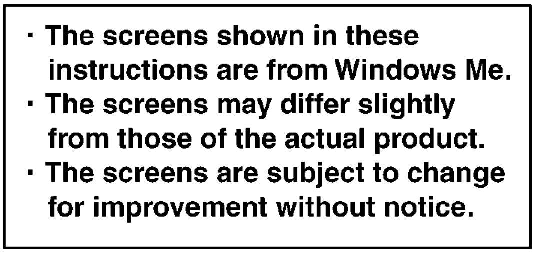
3 Follow the instructions on the screen until all files have been installed.

- Readiris OCR software can also be installed. For details about OCR software.
- If the fax machine is not connected to your computer, the [Port

Selection] dialog box will appear.
Select the port number which you want to use.If the fax machine is connected to your computer, the port number will be automatically detected.

To uninstall the software

1. **Click [Start].**
2. **Point to [Settings], then click [Control Panel].**
3. **Double-click [Add/Remove Programs].**
4. **Select [Panasonic Multi-Function Station] from the list.**
5. **Click [Add/Remove...] (Windows 95/98/ME)/ [Change/Remove...] (Windows 2000), then follow the instructions on the screen.**



- The screens shown in these instructions are from Windows Me.
- The screens may differ slightly from those of the actual product.
- The screens are subject to change for improvement without notice.

2.8. PROBLEMS WITH PC SOFTWARE

2.8.1. General

Problem	Cause & Remedy
I cannot open a TIFF file.	• You must change the compression format of the file. Example: To convert an image using Imaging for Windows. **1.** Click **[Start]**, point to **[Programs]-[Accessories]**, then click **[Imaging]**. **2.** Open the TIFF file that you cannot open in **[Multi-Function Viewer]**. **3.** Select **[Properties]** from the **[Page]** menu. - The **[Page Properties]** dialog box will appear. **4.** Click the [Compression] tab, then select **[CCITT Group 3 (1d) Modified Huffman]** from the drop-down list. **5.** Click **[OK]**. - The compression format of the file is now changed.
[Launcher] disappears.	• Look in the tool bar. If you do not find the **[Launcher]** icon, it is closed. If you do find the icon, it is just minimized. Click the icon in the tool bar.
I cannot recognize the last part of an entry in the list of the [One Touch], [Directory], [Journal] or [Caller ID].	• Put the cursor on the line between the buttons, the cursor changes shape and you can expand the area by dragging or double-clicking.
When I exit Multi-Function Station, the [Multi-Function Viewer] window does not close.	• The **[Multi-Function Viewer]** window can be operated separately. Click the **[X]** button to close the window.
Multi-Function Station does not work properly.	• Click the **[X]** button to exit Multi-Function Station, and restart. If Multi-Function Station still does not close, restart the PC. • If you connect the USB cable to USB hub, connect it to the USB port of your computer directly. • Confirm the BIOS setting of your computer. For parallel connection, select ECP, Bi-directional or an equivalent parallel port mode. For USB connection, select USB port mode. Please refer to your PC operating instructions or consult the manufacturer. • If you have any other multifunction softwares installed on your computer, uninstall it.
I want to replace the parallel cable with a USB cable and vice versa.	• You must change the printer properties. 1. Replace the cables. 2. Set the connection type (parallel or USB) by using the fax machine according to the cable type you use (feature #15) 3. Click **[Start]**, point to **[Settings]**, then click **[Printers]**. 4. Right-click **[Panasonic FLM551/FLB751 Series]** and click **[Properties]**. - The **[Panasonic FLM551/FLB751 Series Properties]** dialog box will appear. 5. Click the **[Details]** (Windows 98/Me) /**[Ports]** (Windows 2000) tab, select the connection type, then click **[OK]**. - If Multi-Function Station does not work correctly, uninstall the software, then re-install it.

2.8.2. Scan

Problem	Cause & Remedy
I cannot scan.	• The fax machine is in use. Try later on. • There is not enough space on the hard disk. Delete unnecessary files and try again. • There is not enough memory. Close some applications and try again. • Restart the PC, and try again. • Check the connection of the PC and the fax machine. • You attempted to scan a document longer than the paper size which you set in the **[Panasonic FLM551/FLB751 Series]** dialog box. Change the setting or divide the document into the appropriate paper size, and try again.
The document does not feed into the fax machine.	• Remove the document and reinsert it.
Even after clicking [Cancel], scanning continues.	• Please wait. It may take a while for the cancel request to be accepted.

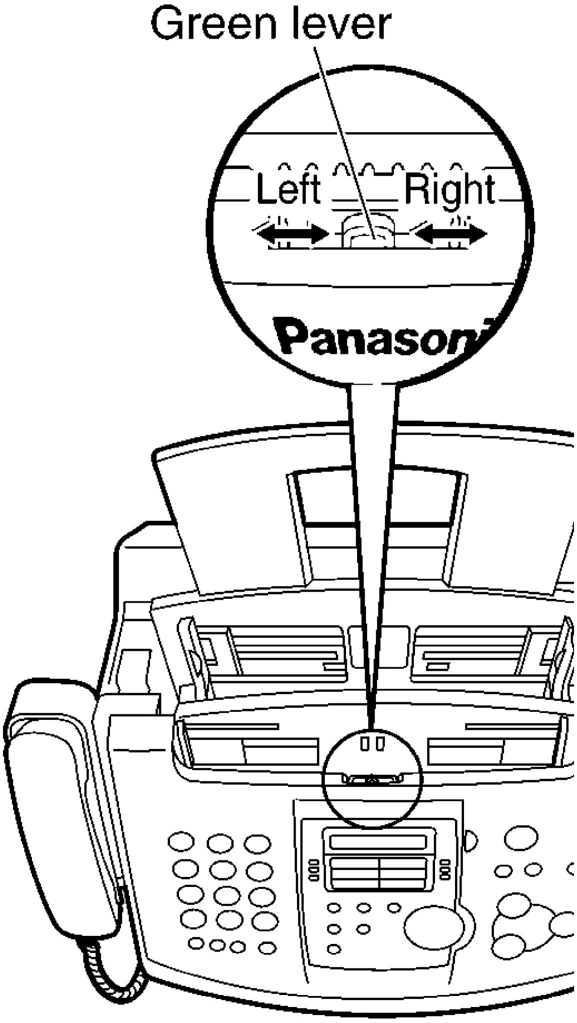
3. ADJUSTMENTS

3.1. ADJUSTING THE FEEDER PRESSURE

If misfeeding of a document such as multiple feeding or no feeding occurs frequently, try to adjust the feeder pressure by following the steps below.

1. **Shift the position of the green lever by using a stick like instrument with a pointed end.**

Left: When documents do not feed.
Center: Standard position (pre-selected)
Right: When documents do multi-feed.



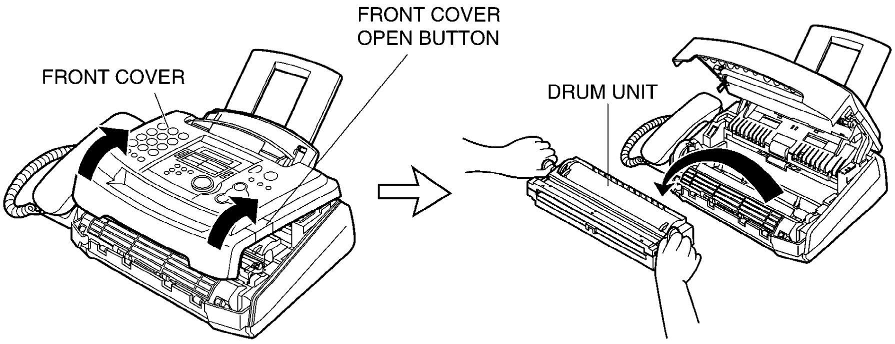
4. DISASSEMBLY INSTRUCTIONS

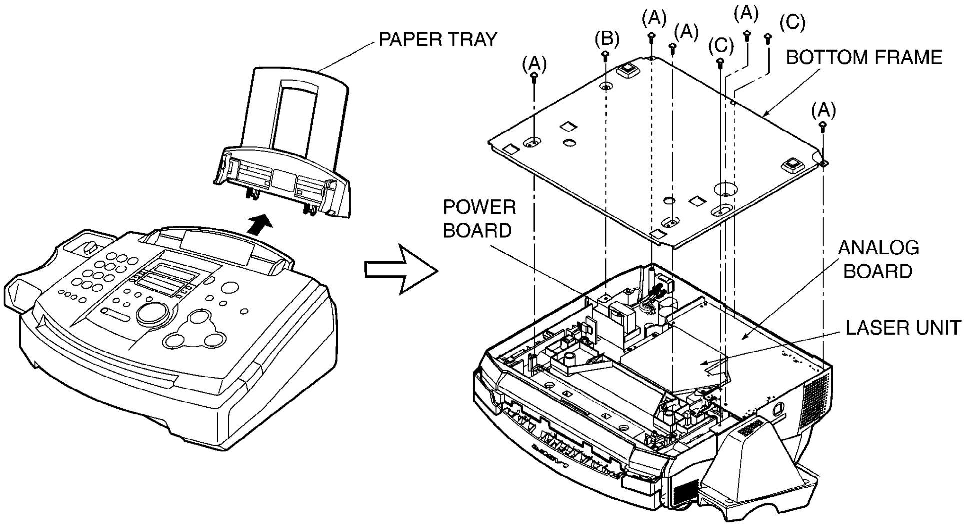
4.1. HOW TO REMOVE THE BOTTOM PLATE, DRUM AND PAPER TARY

Procedure: 1

REF. No. 1

1) Push the FRONT COVER OPEN BUTTON
   and open the FRONT COVER.
2) Remove the DRUM UNIT.
3) Remove the PAPER TRAY.
4) Remove the 5 screws(A).
5) Remove the screws(B) and (C).
6) Remove the BOTTOM FRAME.


FRONT COVER
FRONT COVER OPEN BUTTON
DRUM UNIT

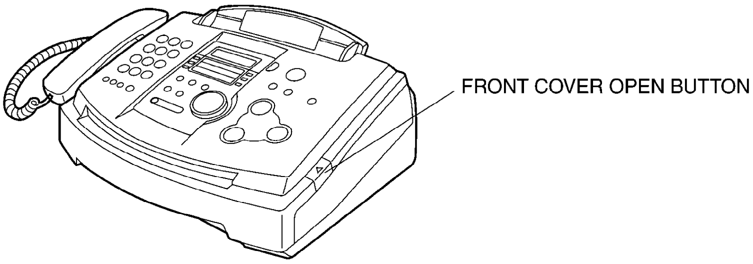

PAPER TRAY
(A)
(B)
(A)
(A)
(C)
(A)
(C)
BOTTOM FRAME
(A)
POWER BOARD
ANALOG BOARD
LASER UNIT

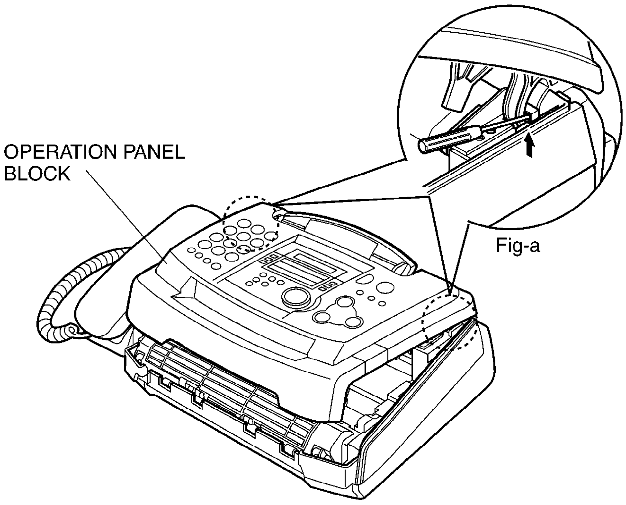
4.2. HOW TO REMOVE THE OPERATION PANEL BLOCK

Procedure: 2

REF. No. 2

1) Press the FRONT COVER OPEN BUTTON.
2) Don't open the OPERATION PANEL BLOCK fully but partly as shown in Fig.-a, and lift up with a precision driver to remove.


FRONT COVER OPEN BUTTON

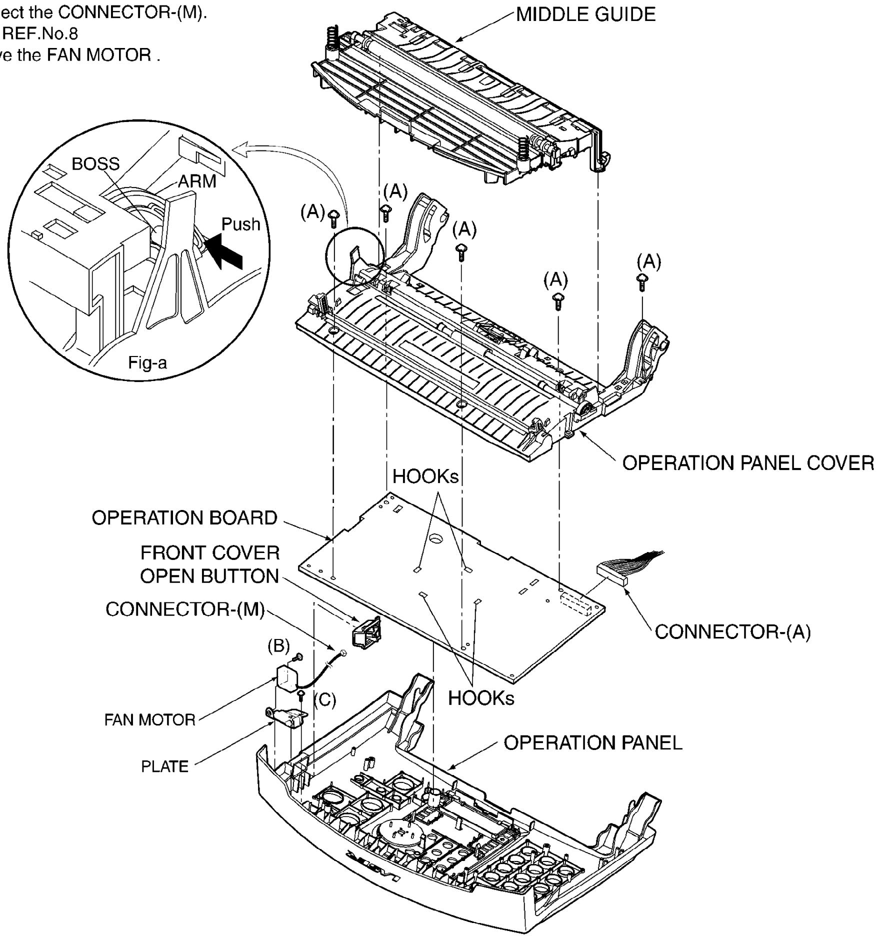

OPERATION PANEL BLOCK
Fig-a

4.3. HOW TO REMOVE THE OPERATION BOARD

Procedure: 1-->2-->3

REF. No. 3

1) Remove the 5 screws(A).
2) Separate the lower frame from the upper frame
   Push the ARM in the direction of the arrow in Fig-a,and unhook the boss.
3) Remove the OPERATION PANEL COVER.
4) Unhook 4 places.
5) Disconnect the CONNECTOR-(A).
6) Remove the OPERATION BOARD.
7) Remove the screws (B) and (C)
8) Remove the PLATE.
9) Disconnect the CONNECTOR-(M).
   See the REF.No.8
10) Remove the FAN MOTOR .

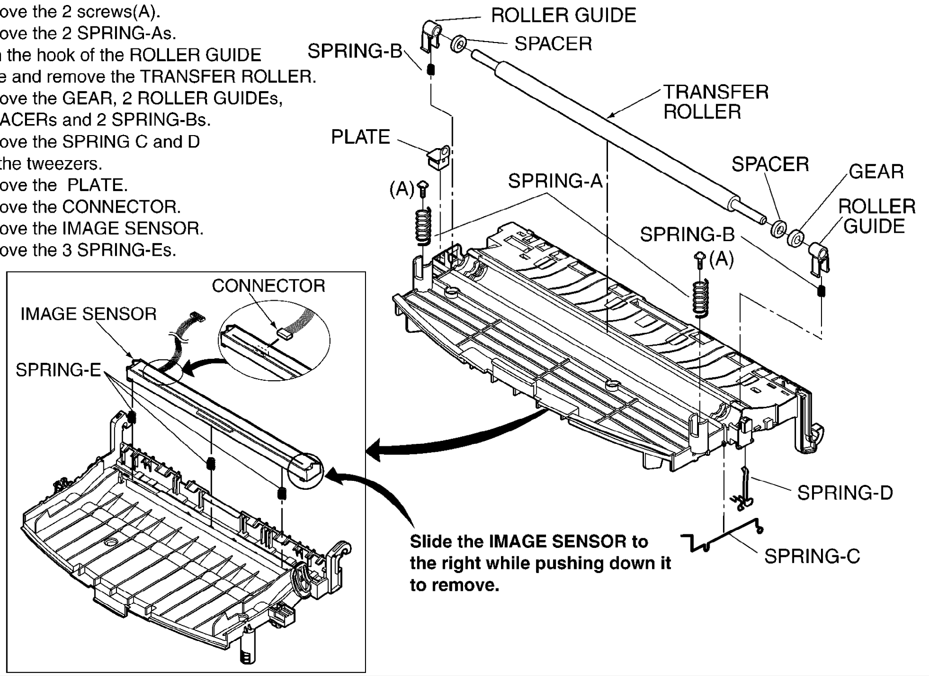

MIDDLE GUIDE
BOSS
ARM
Push
Fig-a
(A)
(A)
(A)
(A)
(A)
OPERATION PANEL COVER
HOOKs
OPERATION BOARD
FRONT COVER
OPEN BUTTON
CONNECTOR-(M)
(B)
(C)
CONNECTOR-(A)
HOOKs
FAN MOTOR
PLATE
OPERATION PANEL

4.4. HOW TO REMOVE THE TRANSFER ROLLER AND IMAGE SENSOR

Procedure: 2-->3-->4

REF. No. 4

1) Remove the 2 screws(A).
2) Remove the 2 SPRING-As.
3) Push the hook of the ROLLER GUIDE inside and remove the TRANSFER ROLLER.
4) Remove the GEAR, 2 ROLLER GUIDEs, 2 SPACERs and 2 SPRING-Bs.
5) Remove the SPRING C and D with the tweezers.
6) Remove the PLATE.
7) Remove the CONNECTOR.
8) Remove the IMAGE SENSOR.
9) Remove the 3 SPRING-Es.


ROLLER GUIDE
SPACER
SPRING-B
TRANSFER ROLLER
PLATE
SPACER
GEAR
(A)
SPRING-A
ROLLER GUIDE
SPRING-B
(A)
CONNECTOR
IMAGE SENSOR
SPRING-E
SPRING-D
SPRING-C

Slide the IMAGE SENSOR to the right while pushing down it to remove.

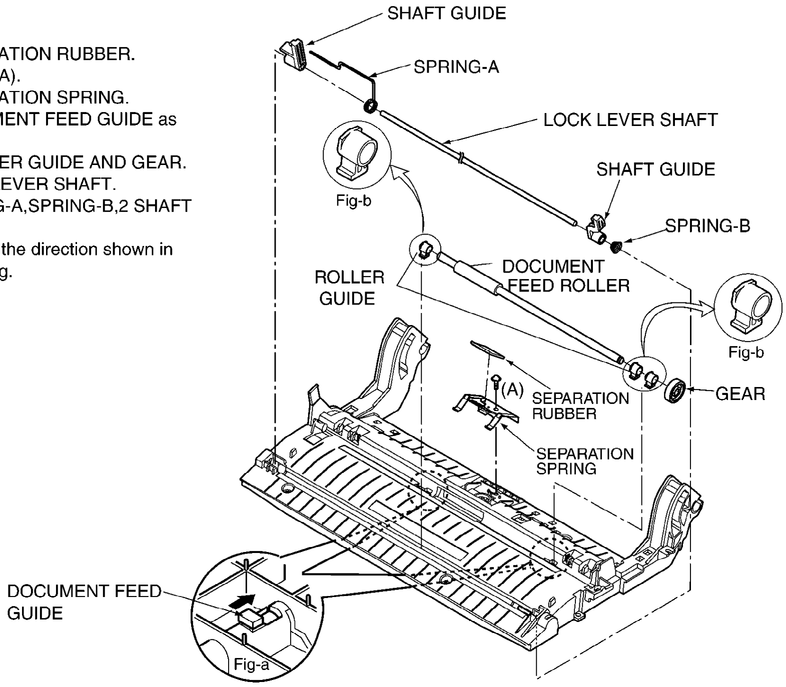
4.5. HOW TO REMOVE THE SEPARATION RUBBER AND DOCUMENT FEED ROLLER

Procedure: 2-->3-->5

REF. No. 5

1) Remove the SEPARATION RUBBER.
2) Remove the screws(A).
3) Remove the SEPARATION SPRING.
4) Remove the DOCUMENT FEED GUIDE as illustrated in Fig-a.
5) Remove the 2 ROLLER GUIDE AND GEAR.
6) Remove the LOCK LEVER SHAFT.
7) Remove the SPRING-A,SPRING-B,2 SHAFT GUIDEs.

*Set the roller holder in the direction shown in Fig-b when assembling.

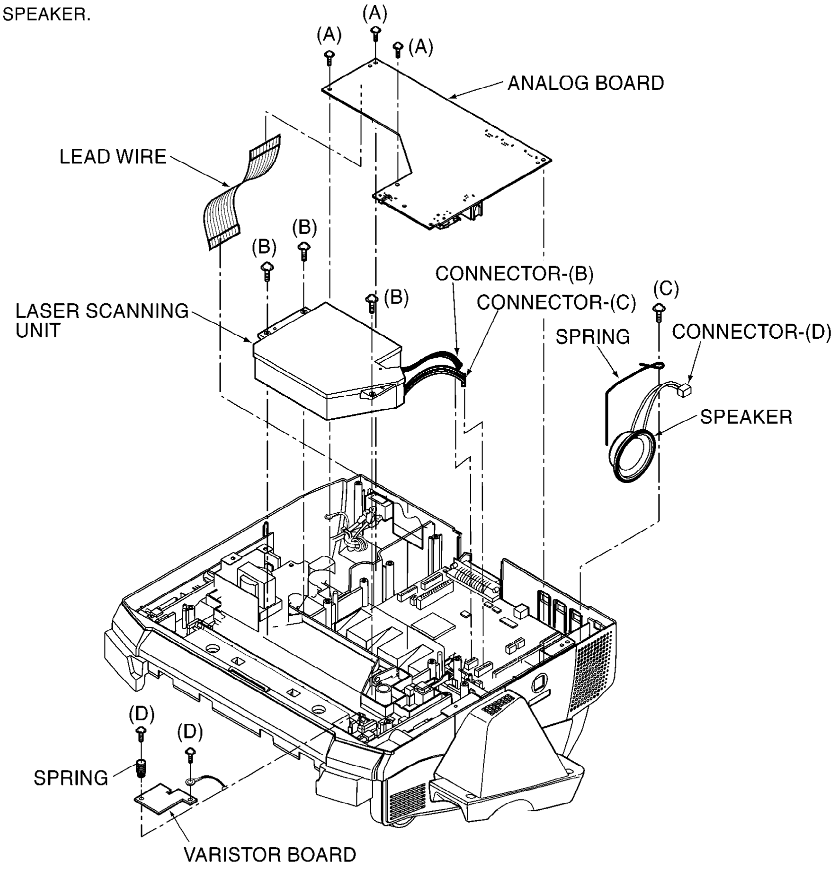

SHAFT GUIDE
SPRING-A
LOCK LEVER SHAFT
Fig-b
SHAFT GUIDE
SPRING-B
ROLLER GUIDE
DOCUMENT FEED ROLLER
Fig-b
(A)
SEPARATION RUBBER
GEAR
SEPARATION SPRING
DOCUMENT FEED GUIDE
Fig-a

4.6. HOW TO REMOVE THE ANALOG BOARD, VARISTOR BOARD, LASER SCANNING UNIT AND SPEAKER

Procedure: 1-->2-->6

REF. No. 6

1) Remove the 2 screws (D) and SPRING-(B).
2) Remove the VARISTOR BOARD.
3) Remove the 3 screws (A).
4) Disconnect the LEAD WIRE.
5) Remove the ANALOG BOARD.
6) Remove the 3 screws(B).
7) Disconnect the CONNECTOR-(B) and CONNECTOR-(C).
8) Remove the LASER SCANNING UNIT.
9) Disconnect the CONNECTOR-(D)
10) Remove the screw (C)
11) Remove the SPRING.
12) Remove the SPEAKER.

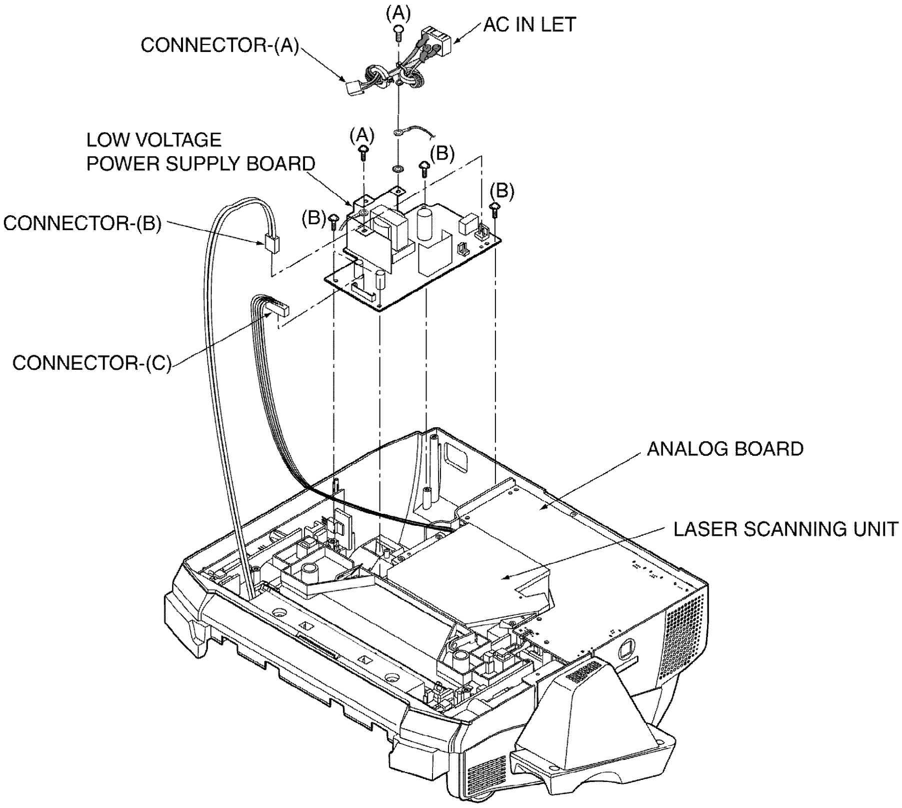

(A)
(A)
(A)
ANALOG BOARD
LEAD WIRE
(B)
(B)
(B)
CONNECTOR-(B)
CONNECTOR-(C)
(C)
LASER SCANNING UNIT
SPRING
CONNECTOR-(D)
SPEAKER
(D)
(D)
SPRING
VARISTOR BOARD

4.7. HOW TO REMOVE THE AC INLET AND LOW VOLTAGE POWER SUPPLY BOARD

Procedure: 1-->7

REF. No. 7

1) Remove the 2 screws(A).
2) Disconnect the CONNECTOR-(A),(B) and (C).
3) Remove the 4 screws(B).
4) Remove the LOW VOLTAGE POWER SUPPLY BOARD.
5) Remove the AC INLET.

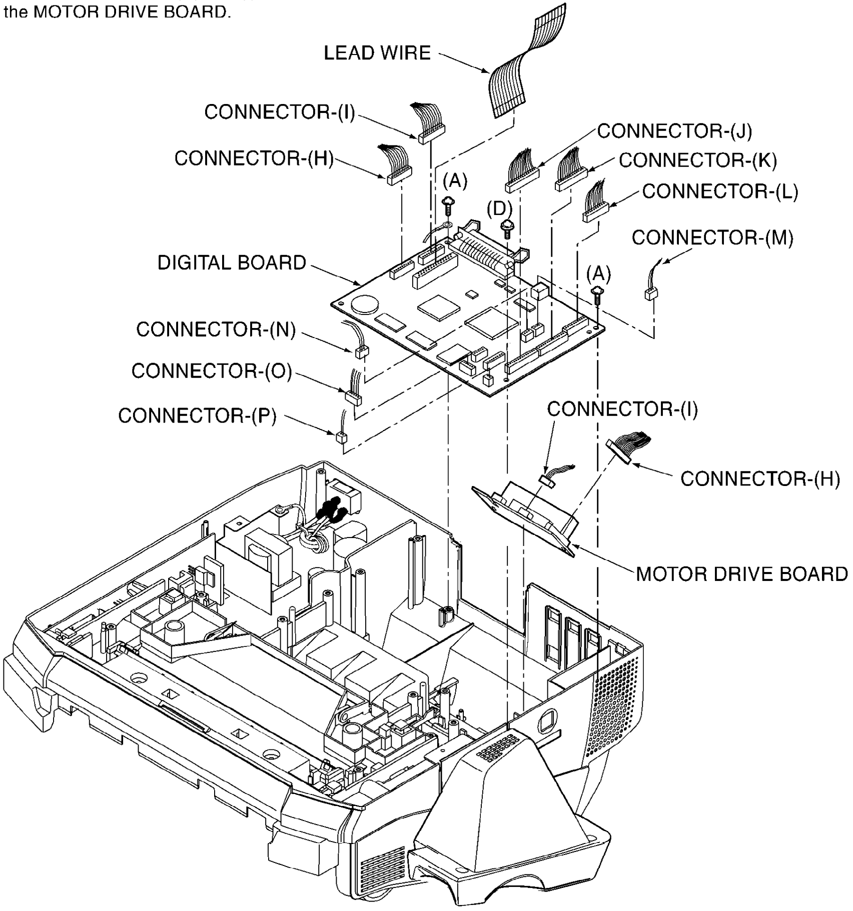

(A)
AC IN LET
CONNECTOR-(A)
LOW VOLTAGE
POWER SUPPLY BOARD
(A)
(B)
(B)
CONNECTOR-(B)
(B)
CONNECTOR-(C)
ANALOG BOARD
LASER SCANNING UNIT

4.8. HOW TO REMOVE THE DIGITAL BOARD AND MOTOR DRIVE BOARD

Procedure: 1-->6-->8

REF. No. 8

1) Disconnect the CONENECTOR-(H),(I),(J),(K),(L),(M,(N),(O) and (P).
2) Disconnect the LEAD WIRE.
3) Remove the 2 screws(A) and screw(D).
4) Remove the DIGITAL BOARD.
5) Disconnect the CONNECTOR-(H) and (I).
6) Remove the MOTOR DRIVE BOARD.

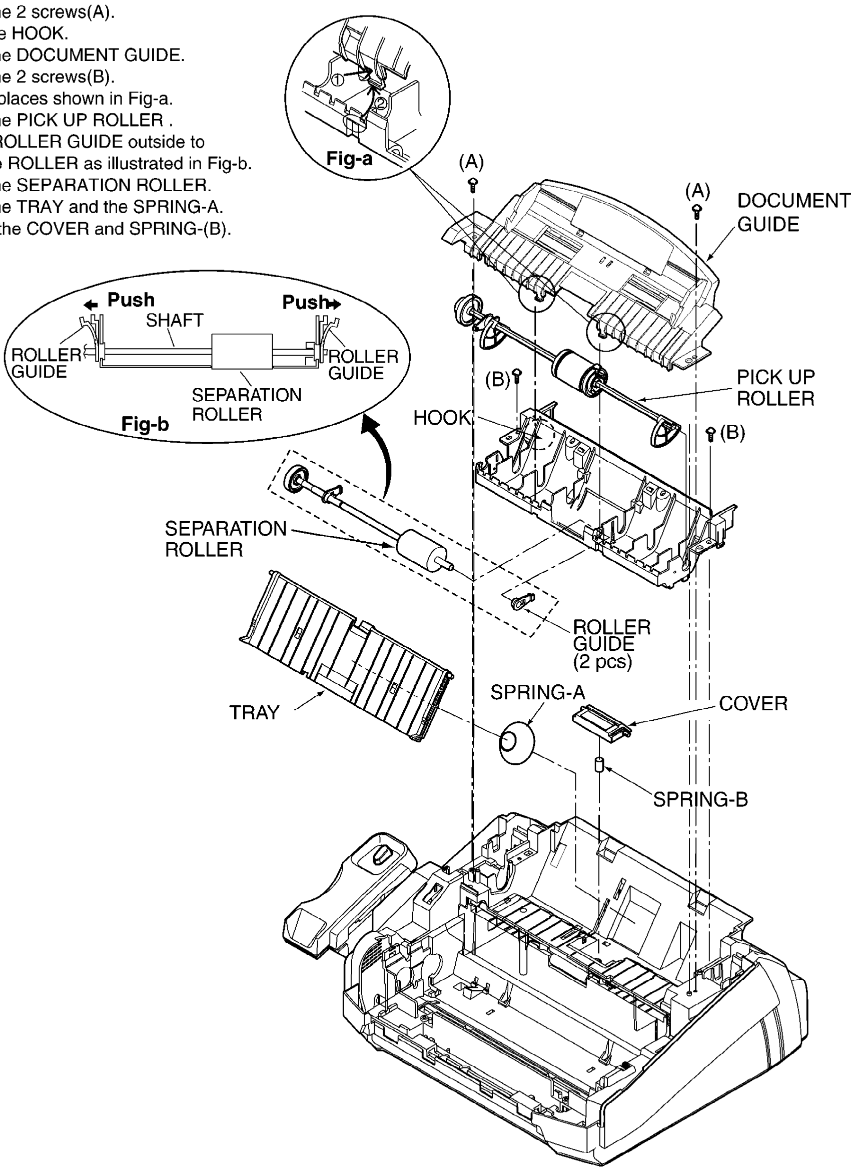

LEAD WIRE
CONNECTOR-(I)
CONNECTOR-(H)
CONNECTOR-(J)
CONNECTOR-(K)
CONNECTOR-(L)
(A)
(D)
CONNECTOR-(M)
DIGITAL BOARD
(A)
CONNECTOR-(N)
CONNECTOR-(O)
CONNECTOR-(P)
CONNECTOR-(I)
CONNECTOR-(H)
MOTOR DRIVE BOARD

4.9. HOW TO REMOVE THE BACK COVER SECTION

Procedure: 2-->9

REF. No. 9

1) Remove the 2 screws(A).
2) Unhook the HOOK.
3) Remove the DOCUMENT GUIDE.
4) Remove the 2 screws(B).
5) Unhook 2 places shown in Fig-a.
6) Remove the PICK UP ROLLER .
7) Push the ROLLER GUIDE outside to release the ROLLER as illustrated in Fig-b.
8) Remove the SEPARATION ROLLER.
9) Remove the TRAY and the SPRING-A.
10) Remove the COVER and SPRING-(B).

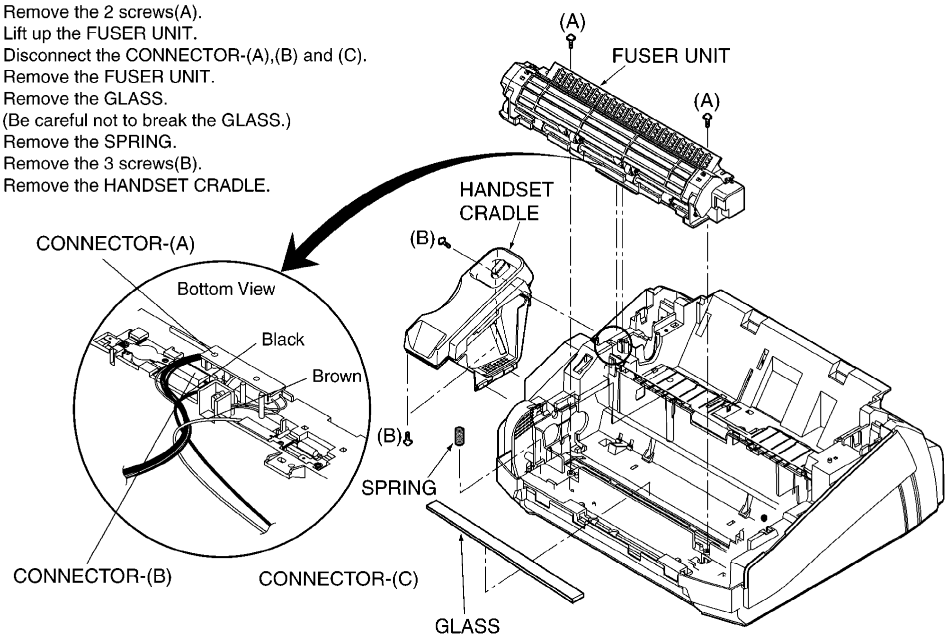

①
②
Fig-a
(A)
(A)
DOCUMENT GUIDE
Push
Push
SHAFT
ROLLER GUIDE
ROLLER GUIDE
SEPARATION ROLLER
Fig-b
(B)
PICK UP ROLLER
HOOK
(B)
SEPARATION ROLLER
ROLLER GUIDE (2 pcs)
SPRING-A
COVER
TRAY
SPRING-B

4.10. HOW TO REMOVE THE FUSER UNIT AND HANDSET CRADLE

Procedure: 1-->2-->6-->7-->8-->10

REF. No. 10

1) Remove the 2 screws(A).
2) Lift up the FUSER UNIT.
3) Disconnect the CONNECTOR-(A),(B) and (C).
4) Remove the FUSER UNIT.
5) Remove the GLASS.
   (Be careful not to break the GLASS.)
6) Remove the SPRING.
7) Remove the 3 screws(B).
8) Remove the HANDSET CRADLE.

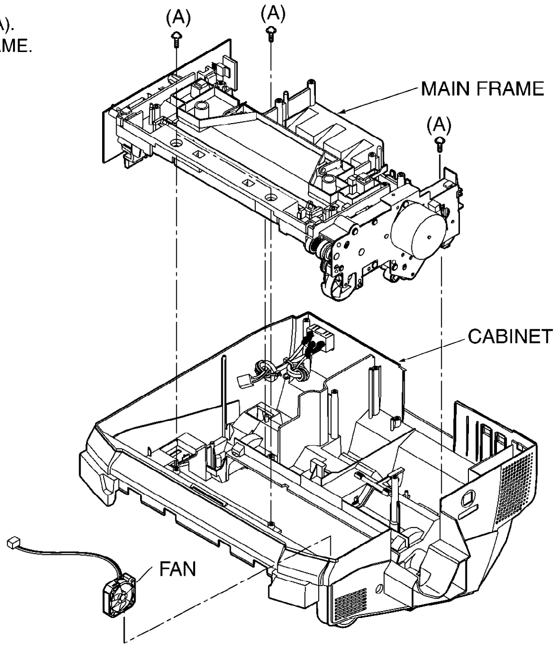

(A)
FUSER UNIT
(A)
HANDSET CRADLE
CONNECTOR-(A)
(B)
Bottom View
Black
Brown
(B)
SPRING
CONNECTOR-(B)
CONNECTOR-(C)
GLASS

4.11. HOW TO REMOVE THE MAIN FRAME AND FAN

Procedure: 1-->6-->7-->11

REF. No. 11

1) Remove the 4 screws(A).
2) Remove the MAIN FRAME.
3) Remove the FAN.

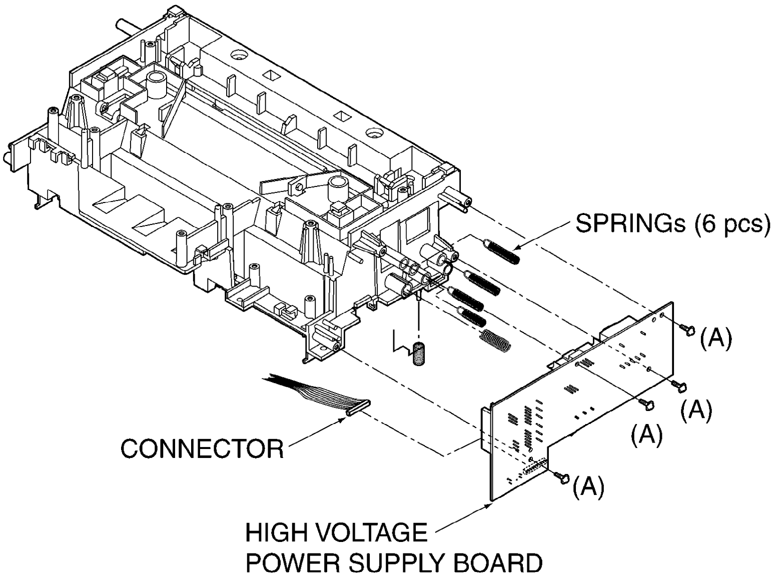

(A)
(A)
MAIN FRAME
(A)
CABINET
FAN

4.12. HOW TO REMOVE THE HIGH VOLTAGE POWER SUPPLY BOARD

Procedure: 1-->6-->7-->11-->12

REF. No. 12

1) Remove the 4 screws(a).
2) Disconnect the CONNECTOR.
3) Remove the HIGH VOLTAGE POWER SUPPLY BOARD.
4) Remove the SPRINGs.

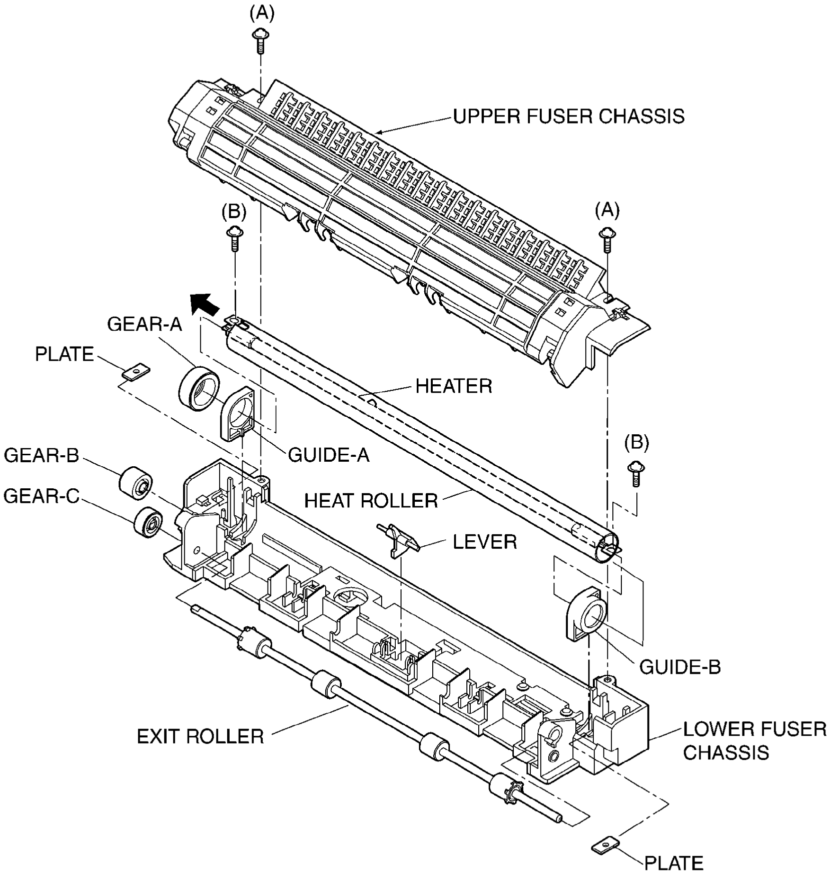

SPRINGs (6 pcs)
(A)
(A)
(A)
(A)
CONNECTOR
HIGH VOLTAGE
POWER SUPPLY BOARD

4.13. HOW TO REMOVE THE HEAT ROLLER AND EXIT ROLLER

Procedure: 1-->6-->7-->8-->10-->13

REF. No. 13

1) Remove the 2 screws(A).
2) Remove the UPPER FUSER CHASSIS.
3) Remove the 2 screws(B).
4) Remove the HEAT ROLLER.
5) Pull out the HEATER in the direction of the arrow as shown to take it out of the HEAT GUIDE.
***Do not touch the glass part of the HEATER.**
6) Remove the GEAR-A, GUIDE-A ,B and the PLATEs.
7) Remove the GEAR-B and C.
8) Remove the EXIT ROLLER.

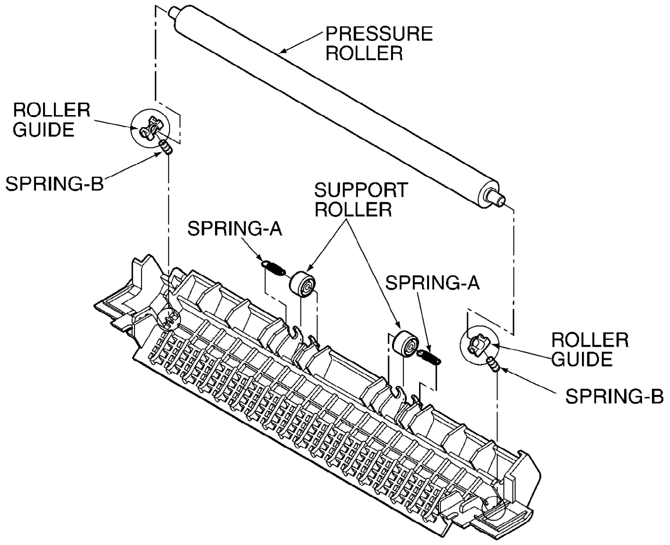

(A)
UPPER FUSER CHASSIS
(B)
(A)
GEAR-A
PLATE
HEATER
GEAR-B
GUIDE-A
(B)
GEAR-C
HEAT ROLLER
LEVER
GUIDE-B
EXIT ROLLER
LOWER FUSER CHASSIS
PLATE

4.14. HOW TO REMOVE THE PRESSURE ROLLER

Procedure: 1-->3-->6-->7-->8-->9-->10-->14

REF. No. 14

1) Remove the 2 SPRINGs-(A) and 2 SUPPORT ROLLERs.
2) Remove the 2 ROLLER GUIDEs.
3) Remove the PRESSURE ROLLER.
4) Remove the 2 SPRINGs-(B).

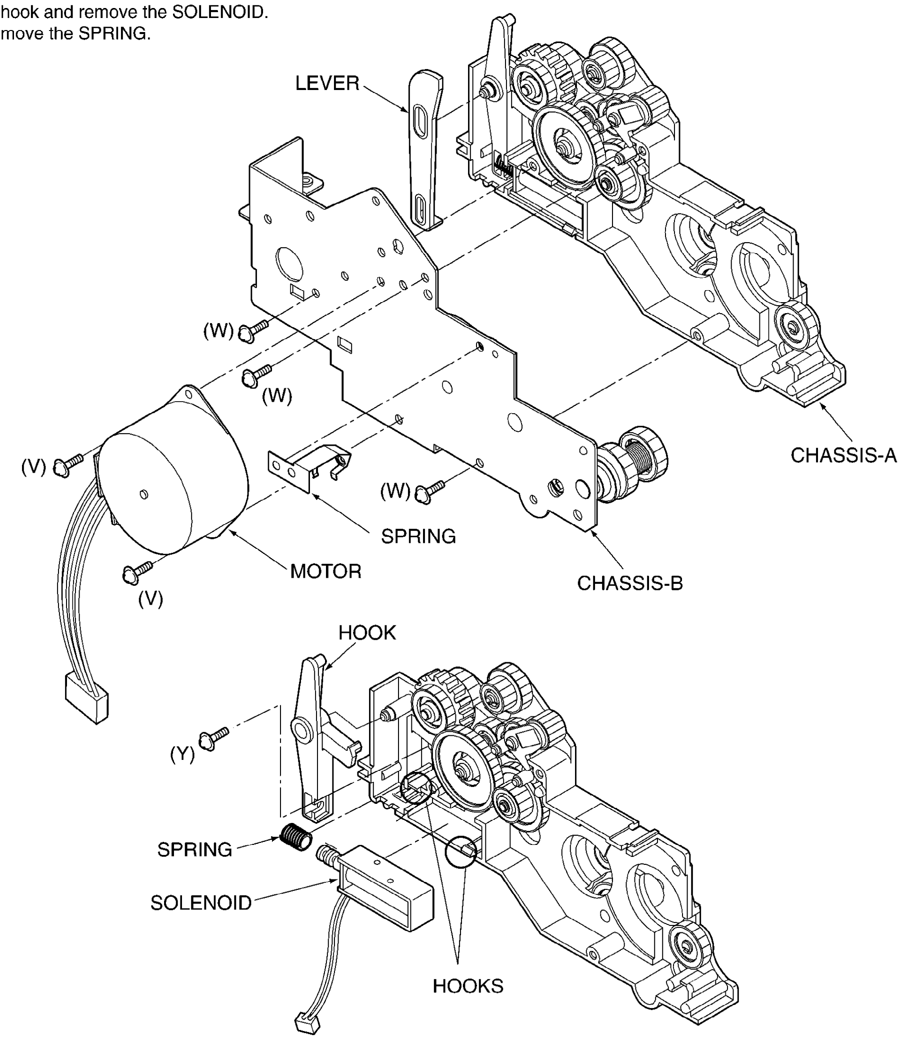

PRESSURE ROLLER
ROLLER GUIDE
SPRING-B
SUPPORT ROLLER
SPRING-A
SPRING-A
ROLLER GUIDE
SPRING-B

4.15. HOW TO REMOVE THE MOTOR BLOCK

Procedure: 1-->3-->6-->7-->8-->9-->10-->11-->15

REF. No. 15-1

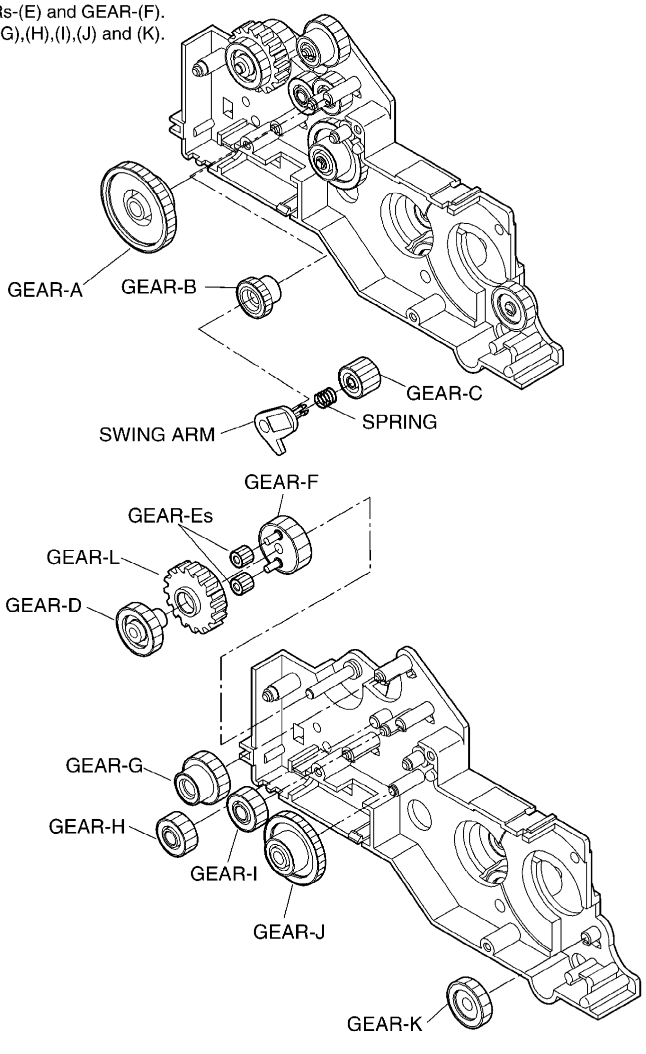
1) Remove the 2 screws(V).
2) Remove the MOTOR.
3) Remove the 3 screws(W).
4) Separate the CHASSIS-B from the CHASSIS-A.
5) Remove the LEVER.
6) Remove the screws(Y).
7) Unhook and remove the SOLENOID.
8) Remove the SPRING.


LEVER
(W)
(W)
(V)
(W)
SPRING
MOTOR
(V)
CHASSIS-A
CHASSIS-B
HOOK
(Y)
SPRING
SOLENOID
HOOKS

Procedure: 1-->3-->6-->7-->8-->9-->10-->11-->15

REF. No. 15-2

1) Remove the GEAR-A.
2) Remove the SWING ARM.
3) Remove the SPRING.
4) Remove the GEAR-(C) and GEAR-(B).
5) Remove the GEAR-(D) and GEAR-(L).
6) Remove the 2 GEARs-(E) and GEAR-(F).
7) Remove the GEAR-(G),(H),(I),(J) and (K).

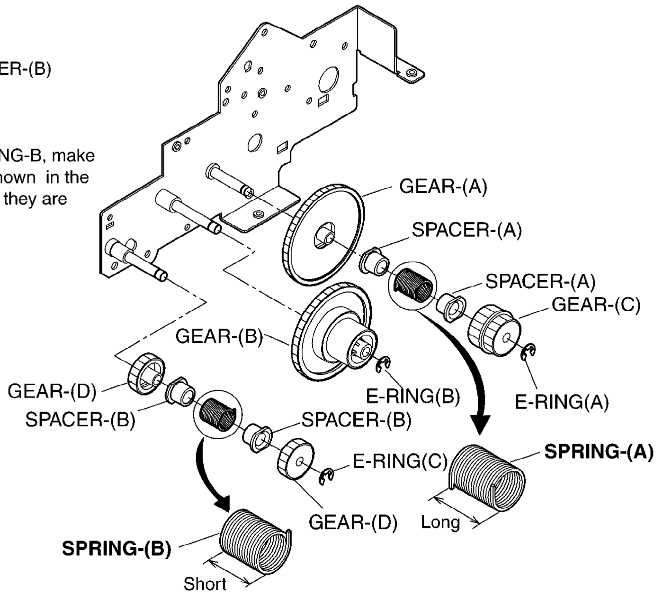

GEAR-A
GEAR-B
GEAR-C
SPRING
SWING ARM
GEAR-F
GEAR-Es
GEAR-L
GEAR-D
GEAR-G
GEAR-H
GEAR-I
GEAR-J
GEAR-K

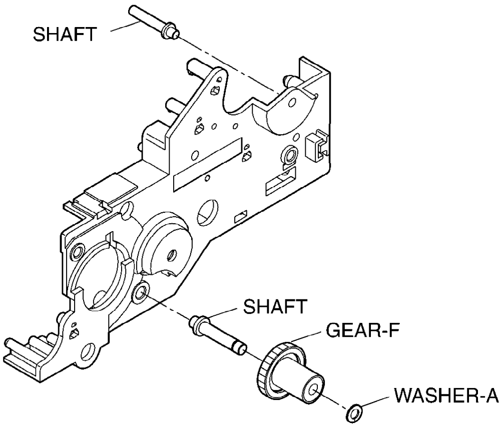
Procedure: 1-->3-->6-->7-->8-->9-->10-->11-->15

REF. No. 15-3

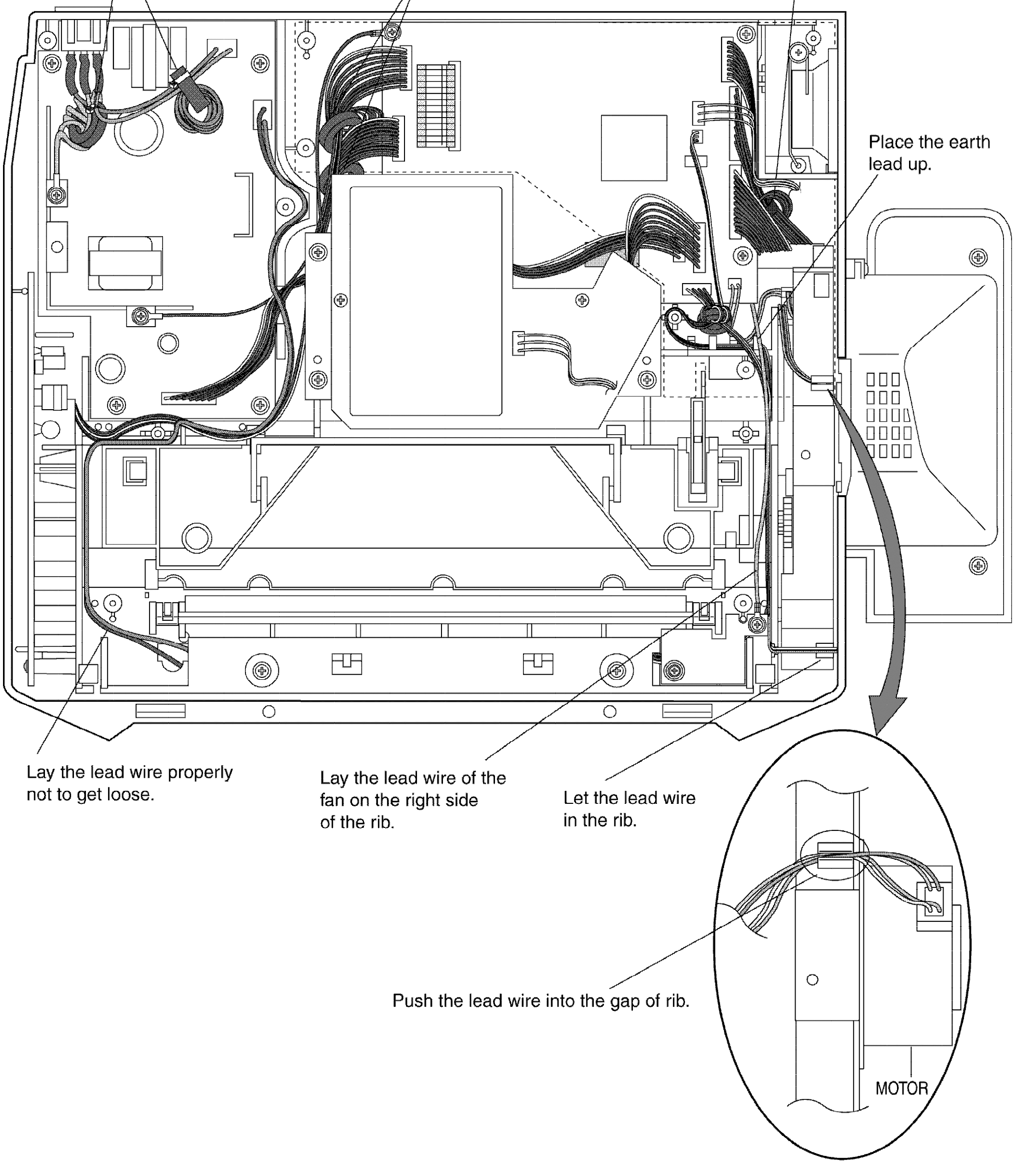
1) Remove the E-RING(A).
2) Remove the GEAR-(C).
2) Remove the 2 SPACER-(A) and SPRING-(A).
3) Remove the E-RING(B).
4) Remove the GEAR-(B).
5) Remove the GEAR-(A).
6) Remove the E-RING(C).
7) Remove the 2 GEARs-(D), 2 SPACER-(B) and SPRING-(B).

*When installing SPRING-A and SPRING-B, make sure the rolling direction and length shown in the figure not to make a mistake because they are very similar.


GEAR-(A)
SPACER-(A)
SPACER-(A)
GEAR-(C)
GEAR-(B)
GEAR-(D)
SPACER-(B)
E-RING(B)
E-RING(A)
SPACER-(B)
E-RING(C)
SPRING-(A)
GEAR-(D)
Long
SPRING-(B)
Short


SHAFT
SHAFT
GEAR-F
WASHER-A

4.16. INSTALLATION POSITION OF THE LEAD



Place these two ferrite cores apart as far as possible.

Coil the lead wire 4 turns.

Coil the lead wire 2 turns.

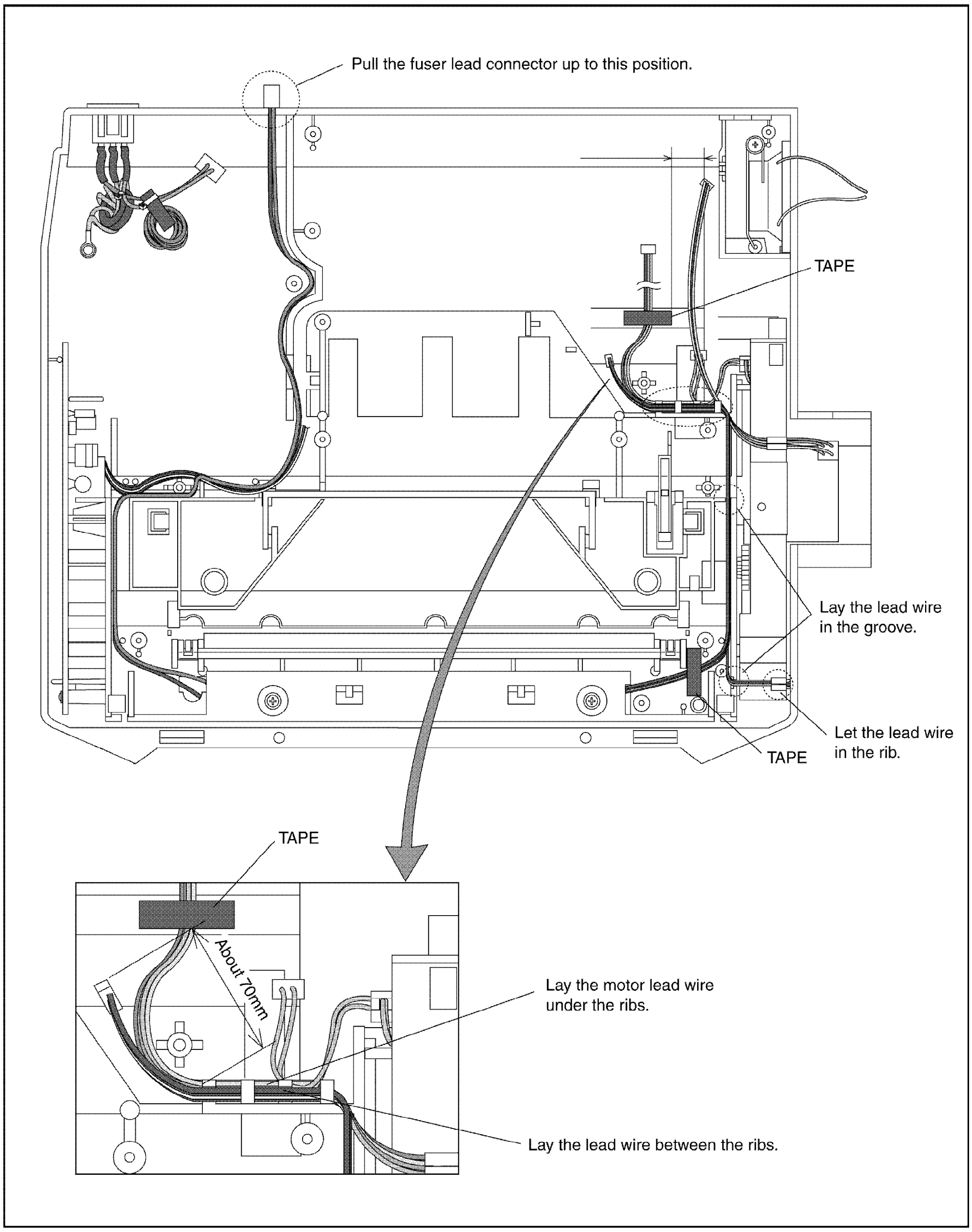
Place the earth lead up.

Lay the lead wire properly not to get loose.

Lay the lead wire of the fan on the right side of the rib.

Let the lead wire in the rib.

Push the lead wire into the gap of rib.


TAPE
TAPE
TAPE
About 70mm

Pull the fuser lead connector up to this position.

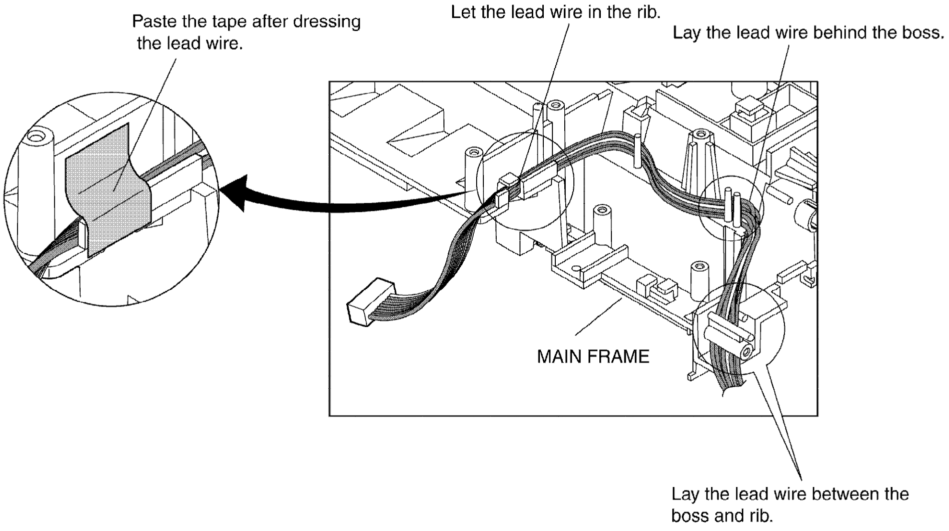
Lay the lead wire in the groove.

Let the lead wire in the rib.

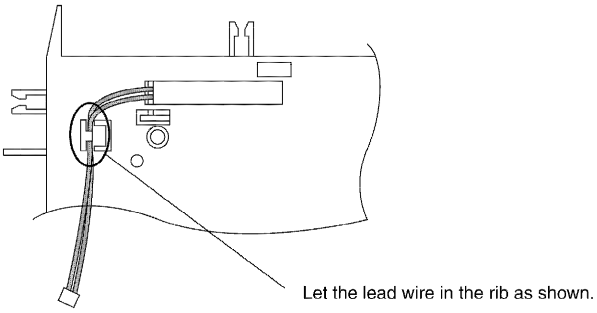
Lay the motor lead wire under the ribs.

Lay the lead wire between the ribs.

Placing the lead wire of HIGH VOLTAGE POWER SUPPLY BOARD - DIGITAL BOARD

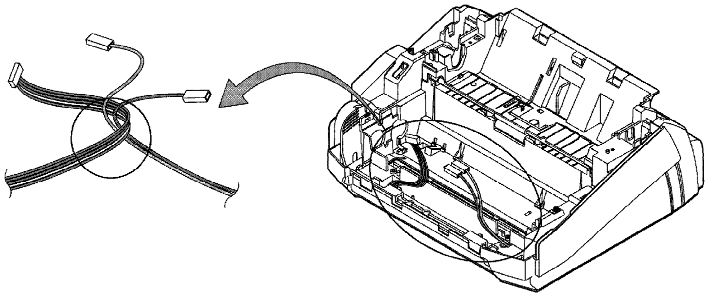

Paste the tape after dressing the lead wire.
Let the lead wire in the rib.
Lay the lead wire behind the boss.
MAIN FRAME
Lay the lead wire between the boss and rib.

Placing the lead wire of the solenoid.


Let the lead wire in the rib as shown.

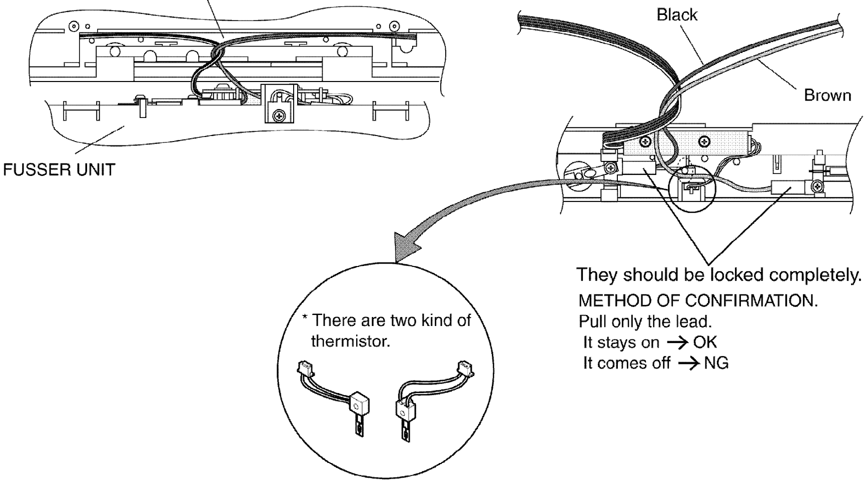
Placing the lead wire of FUSSER UNIT.

Intersect the lead wires as figure below



When installing the fusser unit to the main unit, be sure not to catch the lead wire between the wall and the fusser unit.
Lead wires must not clamp when inserting Fusser Unit.

After connecting Fusser lead wire, pass the brown wire in between the rib and the wall.



They should be locked completely.
METHOD OF CONFIRMATION.
Pull only the lead.
It stays on → OK
It comes off → NG

* There are two kind of thermistor.

5. HOW TO REPLACE THE FLAT PACKAGE IC

Even if you do not have the special tools (for example, a spot heater) to remove the Flat IC, with some solder (large amount), a soldering iron and a cutter knife, you can easily remove the ICs that have more than 100 pins.

5.1. PREPARATION

- SOLDER
Sparkle Solder 115A-1, 115B-1 OR Almit Solder KR-19, KR-19RMA
- Soldering iron

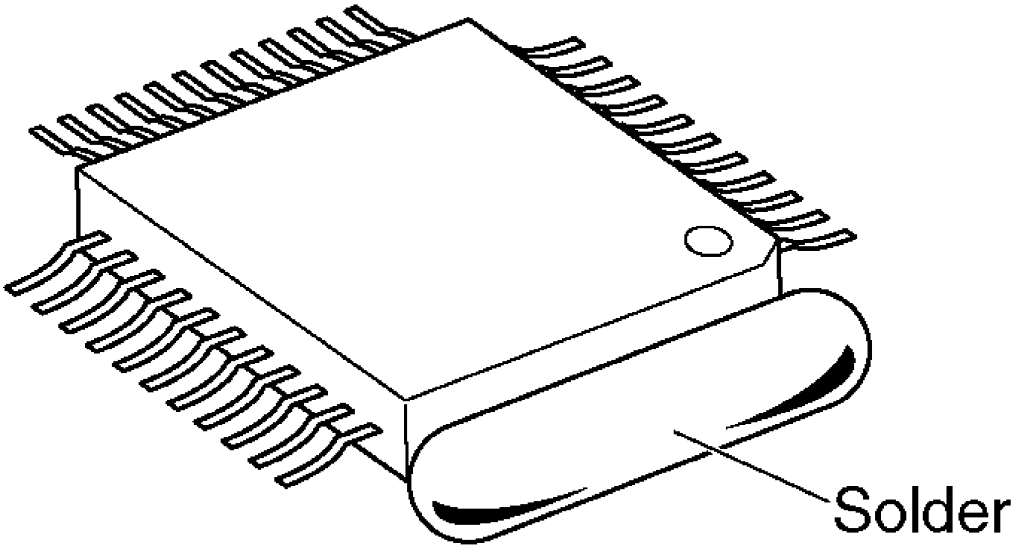
Recommended power consumption is between 30 W to 40 W.
Temperature of Copper Rod 662 ± 50°F (350 ± 10°C)
(An expert may handle a 60~80 W iron, but a beginner might damage the foil by overheating.)

- Flux
  HI115 Specific gravity 0.863
  (Original flux should be replaced daily.)

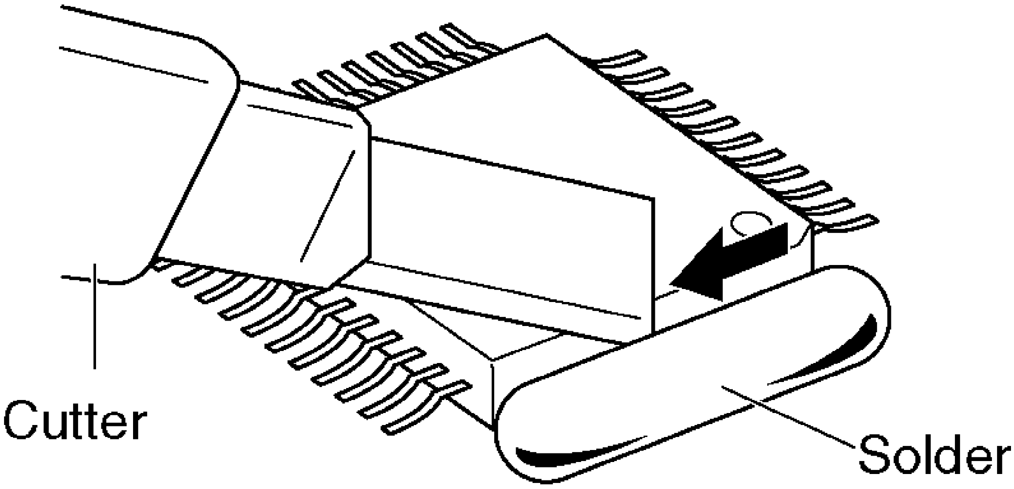
5.2. FLAT PACKAGE IC REMOVAL PROCEDURE

1. Put plenty of solder on the IC pins so that the pins can be completely covered.

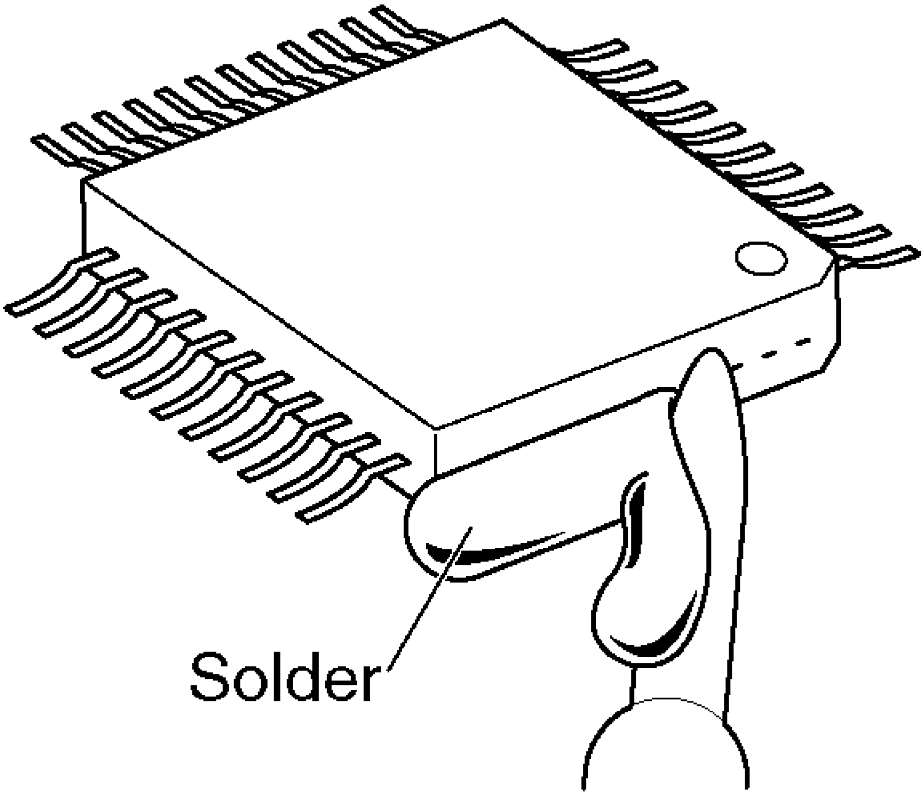
Note:
If the IC pins are not soldered enough, you may give pressure to the P.C. board when cutting the pins with a cutter.



2. Make a few cuts into the joint (between the IC and its pins) first and then cut off the pins thoroughly.



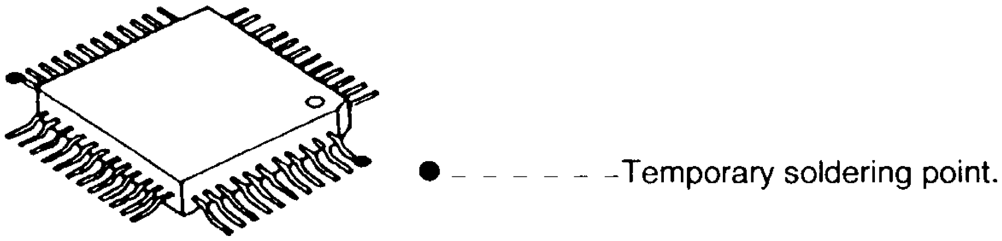
3. While the solder melts, remove it together with the IC pins.



When you attach a new IC to the board, remove all solder left on the land with some tools like a soldering wire. If some solder is left at the joint on the board, the new IC will not be attached properly.

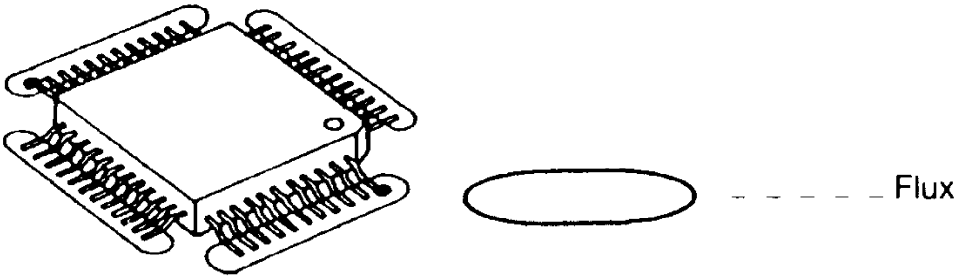
5.3. FLAT PACKAGE IC INSTALLATION PROCEDURE

1. Temporarily fix the FLAT PACKAGE IC, soldering the two marked pins.

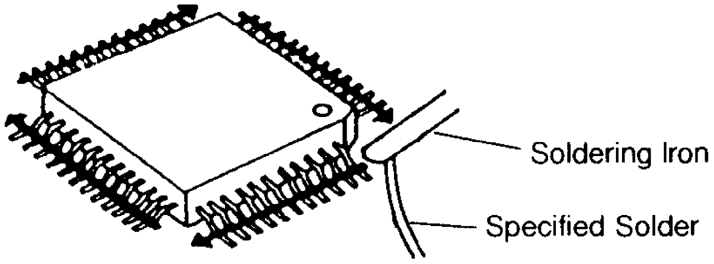

● - - - - - -Temporary soldering point.

***Check the accuracy of the IC setting with the corresponding soldering foil.**

2. Apply flux to all pins of the FLAT PACKAGE IC.



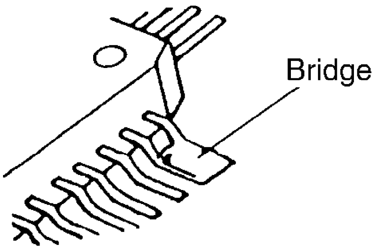
3. Solder the pins, sliding the soldering iron in the direction of the arrow.

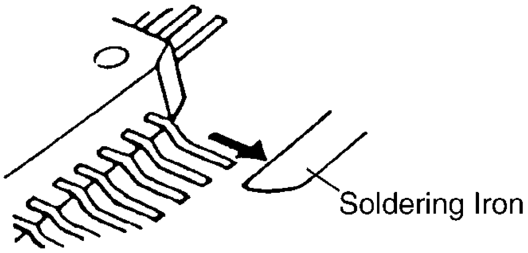

Soldering Iron
Specified Solder

5.4. BRIDGE MODIFICATION PROCEDURE

1. Lightly resolder the bridged portion.

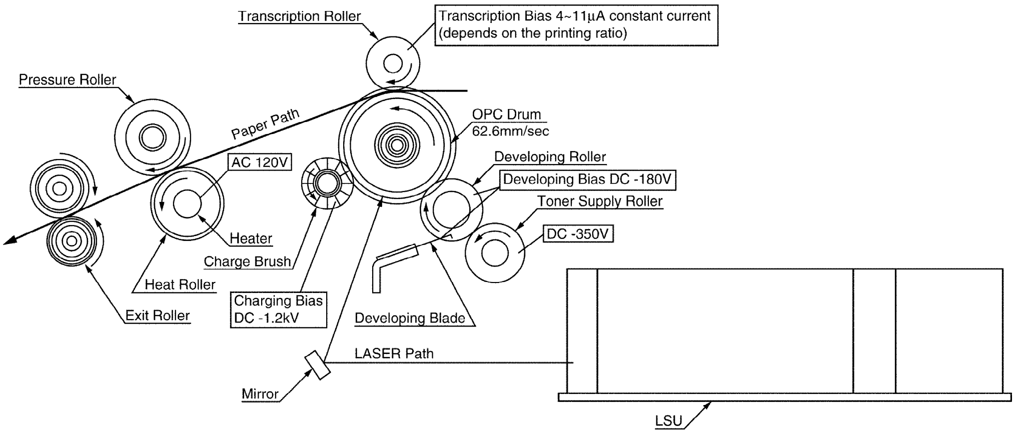
2. Remove the remaining solder along the pins using a soldering iron as shown in the figure below.




Soldering Iron

6. PRINTING OPERATION PRINCIPLE

6.1. PROCESS CHART AND PROCESS BIAS

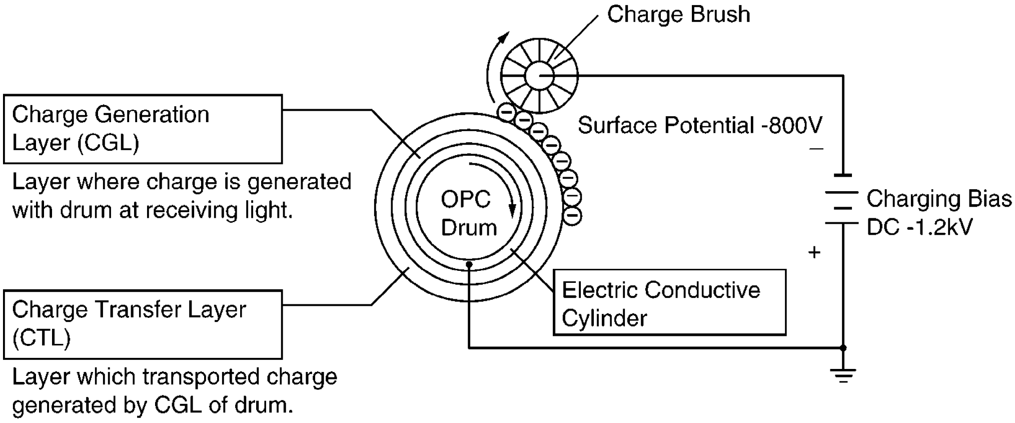

Transcription Roller
Transcription Bias 4~11µA constant current
(depends on the printing ratio)
Pressure Roller
Paper Path
OPC Drum
62.6mm/sec
AC 120V
Developing Roller
Developing Bias DC -180V
Toner Supply Roller
DC -350V
Heater
Charge Brush
Heat Roller
Charging Bias
DC -1.2kV
Exit Roller
Developing Blade
LASER Path
Mirror
LSU

6.2. CHARGING

Charging is the stage that keeps the surface of the sensitive drum a fixed electric potential. The sensitive drum is the Organic Photo Conductor (OPC), which is a electric conductive cylinder whose surface is covered with the Charge Generation Layer (CGL) and Charge Transfer Layer (CTL).

When the charging bias (DC -1.2 kV) is added and the minus charge is supplied to the charge brush while charging, the whole surface potential of the drum is -800V.

Charging Part

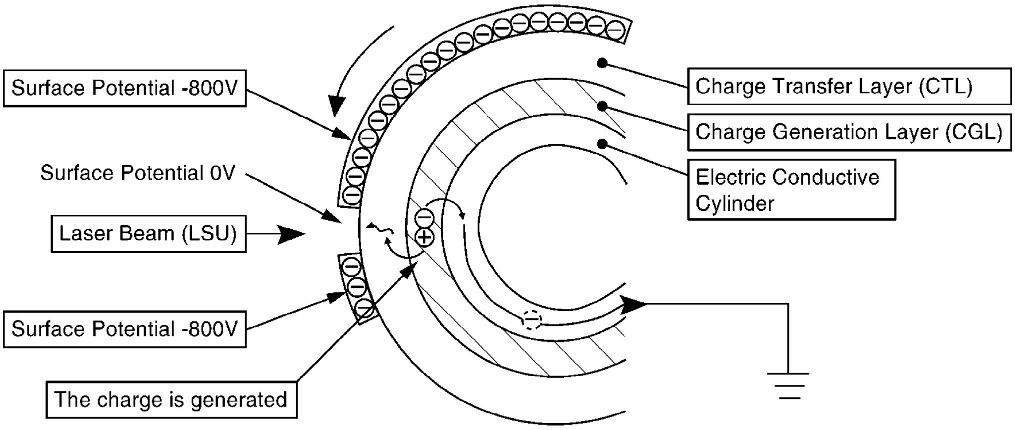

Charge Brush
Charge Generation Layer (CGL)
Layer where charge is generated with drum at receiving light.
Surface Potential -800V
–
OPC Drum
Charging Bias DC -1.2kV
+
Charge Transfer Layer (CTL)
Layer which transported charge generated by CGL of drum.
Electric Conductive Cylinder

6.3. EXPOSING

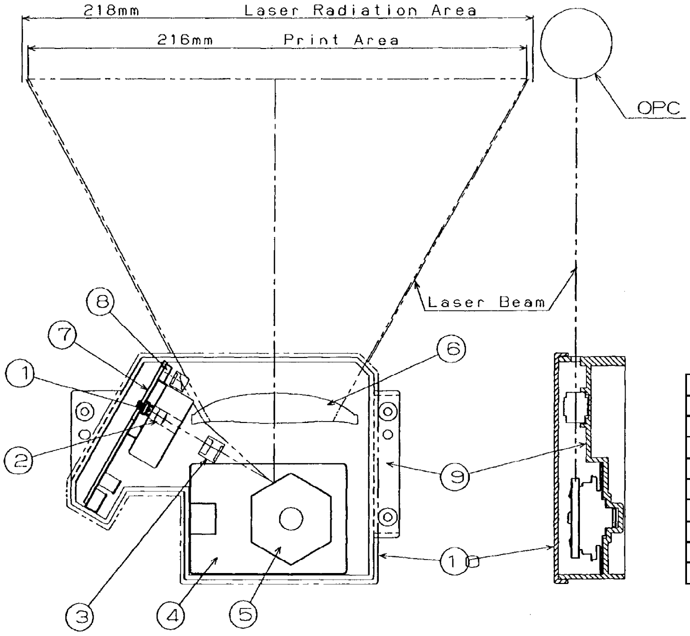
When the drum which is charged with the fixed electric charge is irradiated by the laser beam, the plus charge and minus charge are generated at the Charge Generation Layer. Passing through the Charge Transfer Layer which conducts the plus charge, the minus-charged drum's surface is neutralized to be skipped. Then the minus charge goes to the ground from the electric conductive cylinder. Consequently the charge of the part which is not exposed remains as it is, and the electric potential of the scanned part changes.

At that time an invisible image is created on the drum.

Exposing Part


Surface Potential -800V
Surface Potential 0V
Laser Beam (LSU)
Surface Potential -800V
The charge is generated
Charge Transfer Layer (CTL)
Charge Generation Layer (CGL)
Electric Conductive Cylinder

6.4. LASER SCANNING UNIT LOCATIONS


218mm
Laser Radiation Area
216mm
Print Area
OPC
Laser Beam
8
7
1
2
6
9
10
3
4
5

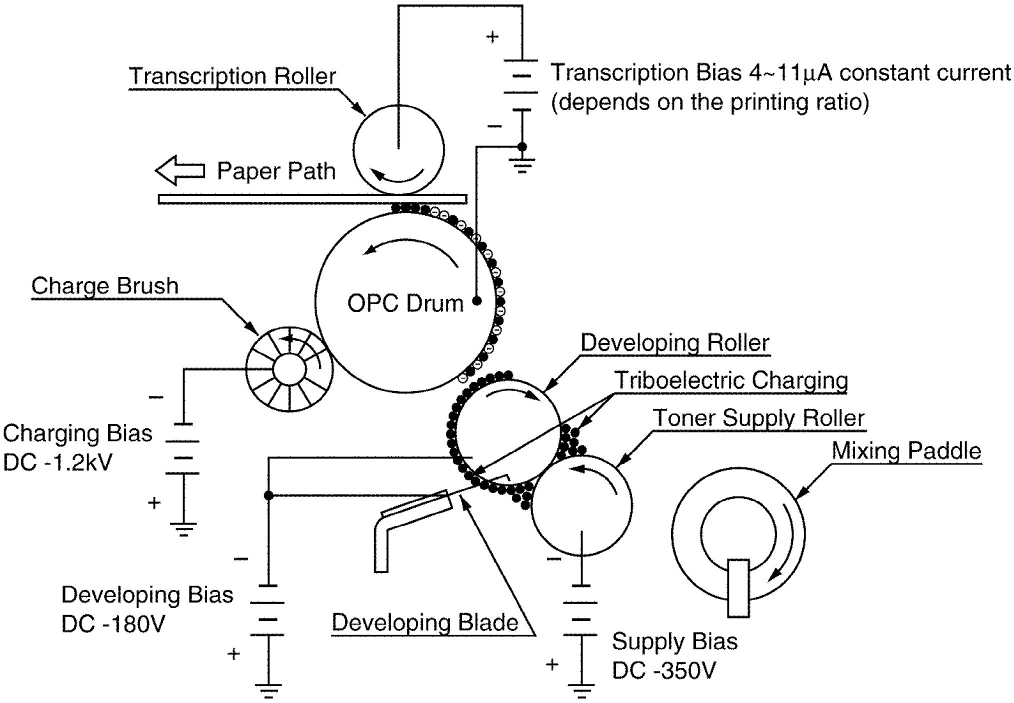
10	Cover
9	Housing
8	Pin Photodiode
7	LD Driving Circuit
6	fq Lens
5	Polygon Mirror
4	Scanning Motor Driving Circuit
3	Cylindrical Lens
2	Collimator Lens
1	Semiconductor Laser Diode

6.5. DEVELOPING AND TRANSCRIPTION

The developing is the stage that the OPC drum with an invisible image is changed to visible by the toner. The developer consists of mixing paddle, toner supply roller, developing roller, developing blade and OPC drum. The bias voltage is added to the developing roller (DC -180V) and toner supply roller (DC -350V). Firstly the toner is mixed up in the mixing paddle and minus-charged by triboelectricity, then led to the toner supply roller. Secondly the potential difference causes to send the toner to the developing roller from the toner supply roller. The supplied toner to the developing roller is kept to a certain layer thickness by the developing blade and also it is charged by triboelectricity. Consequently the toner is transferred to the surface of the exposed OPC drum by the potential difference between the developing roller and OPC drum's surface.

The transcription is the stage that the created image on the OPC drum is transferred to the paper. When the transcription roller is plus-charged with the image, the minus-charged toner particles are gathered on the surface of the drum and transferred to the paper.

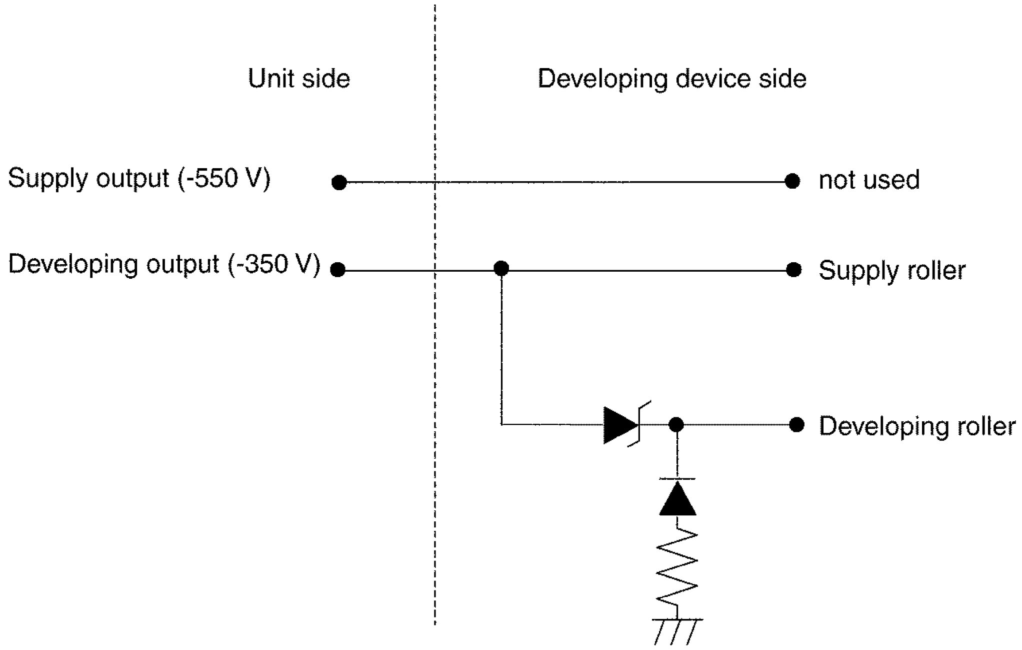
Developing and Transcription Part


Transcription Roller
Transcription Bias 4~11µA constant current
(depends on the printing ratio)
Paper Path
Charge Brush
OPC Drum
Developing Roller
Triboelectric Charging
Toner Supply Roller
Mixing Paddle
Charging Bias
DC -1.2kV
Developing Bias
DC -180V
Developing Blade
Supply Bias
DC -350V

The values of developing bias and supply bias are different from the ones described in the Service Manual for FL501.
The biases output from the unit of FL501 and FLM551 have the same voltage. However, the developing device of FA77D converts the developing and supply biases inside the developing device to improve the image quality.

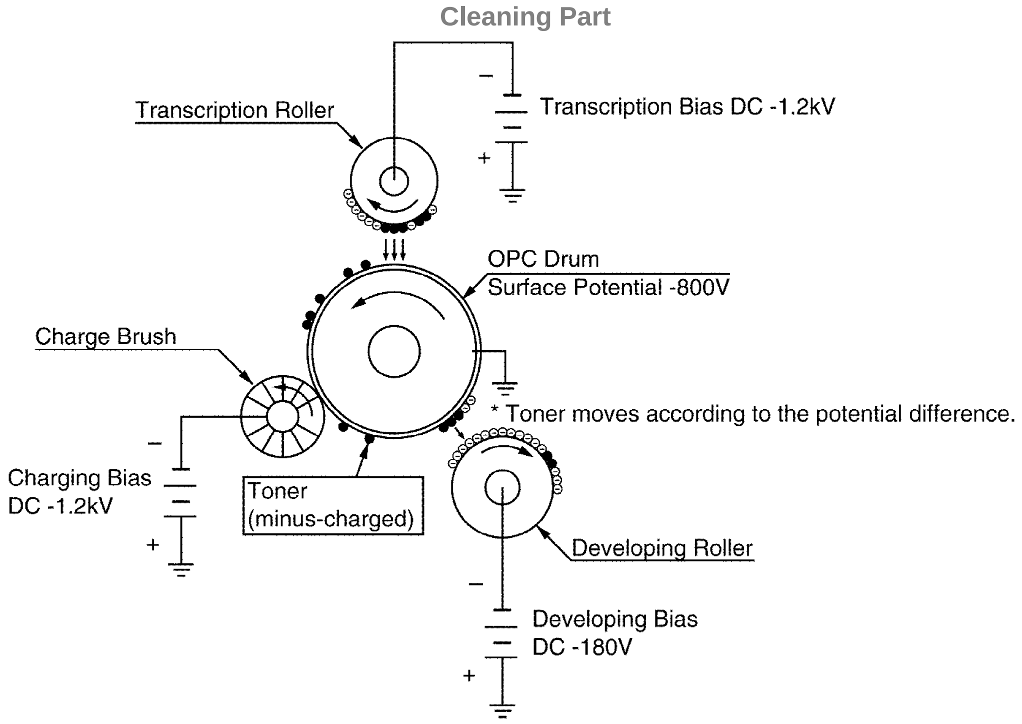
	FA77 developing device	**FA77D developing device**
Developing bias	**-350V**	**-180V**
Supply bias	**-550V**	**-350V**

Inside voltage conversion circuit of the developing device


Unit side
Developing device side
Supply output (-550 V)
not used
Developing output (-350 V)
Supply roller
Developing roller

6.6. CLEANING

The toner attached to the surface of the OPC drum is transferred to the paper at the transcription stage, but a part of the toner remains. The cleaning is the stage that cleans the remain toner after the transcription stage. The remain toner on the drum and the toner which was attached to the place where the laser beam didn't scan are gathered to the developing roller to be used again. When no paper is supplied, the transcription roller is minus-charged to eliminate the minus-charged toner.

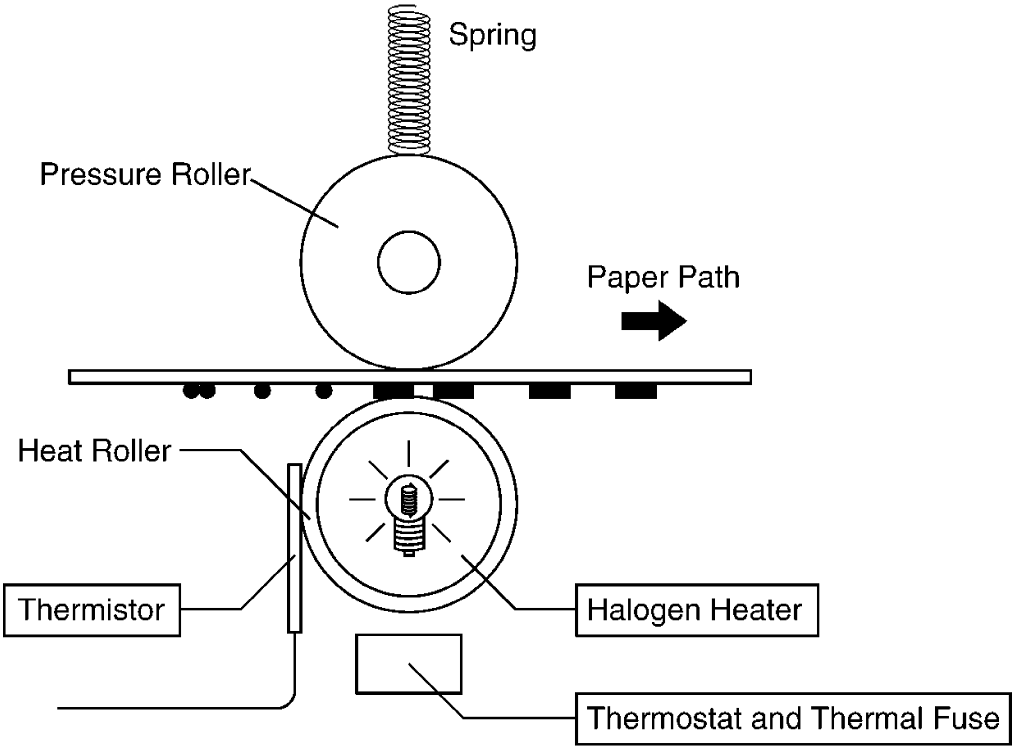

Cleaning Part
Transcription Roller
–
+
Transcription Bias DC -1.2kV
OPC Drum
Surface Potential -800V
Charge Brush
* Toner moves according to the potential difference.
–
Charging Bias
DC -1.2kV
+
Toner
(minus-charged)
Developing Roller
–
Developing Bias
DC -180V
+

6.7. FIXING

On the process of the transcription, the transferred toner is weakly attached on the paper.

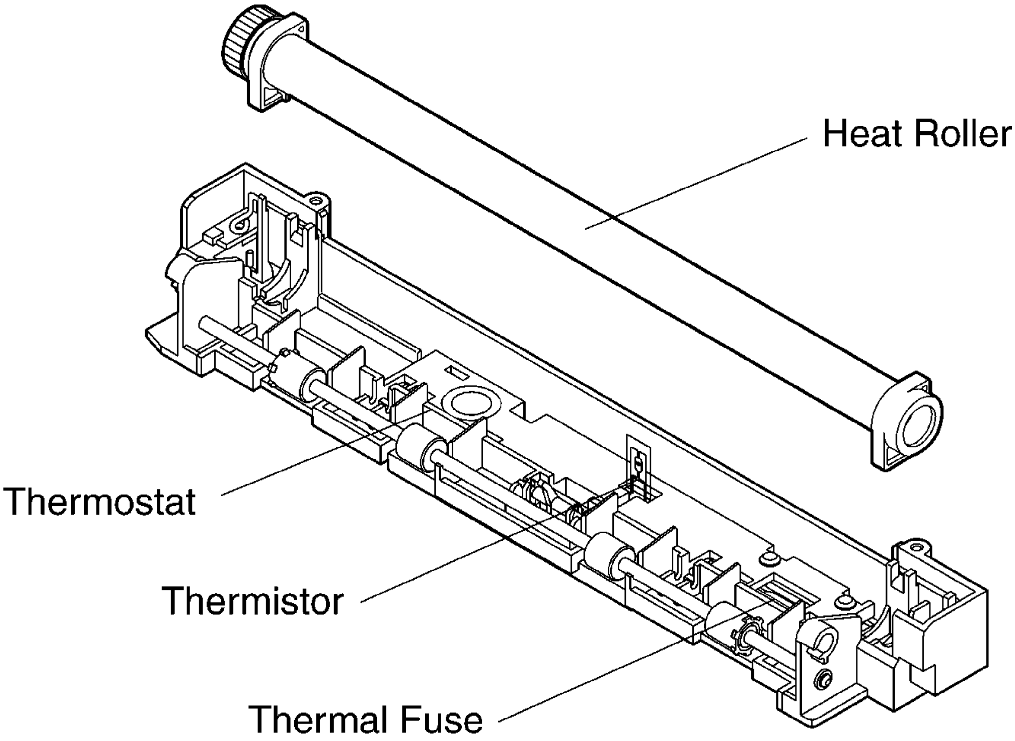
Fixing means the process to fix the toner on the paper permanently. The fixing part melts the toner at the high temperature using the halogen heater. The toner is fixed on the paper by the heat and pressure through the fixing part with the image. The surface of the heat roller is rosined by Teflon and lubricated to prevent from attaching the toners. The press roller is made of silicon, and its spring compresses the melted toner.

Fixing Part

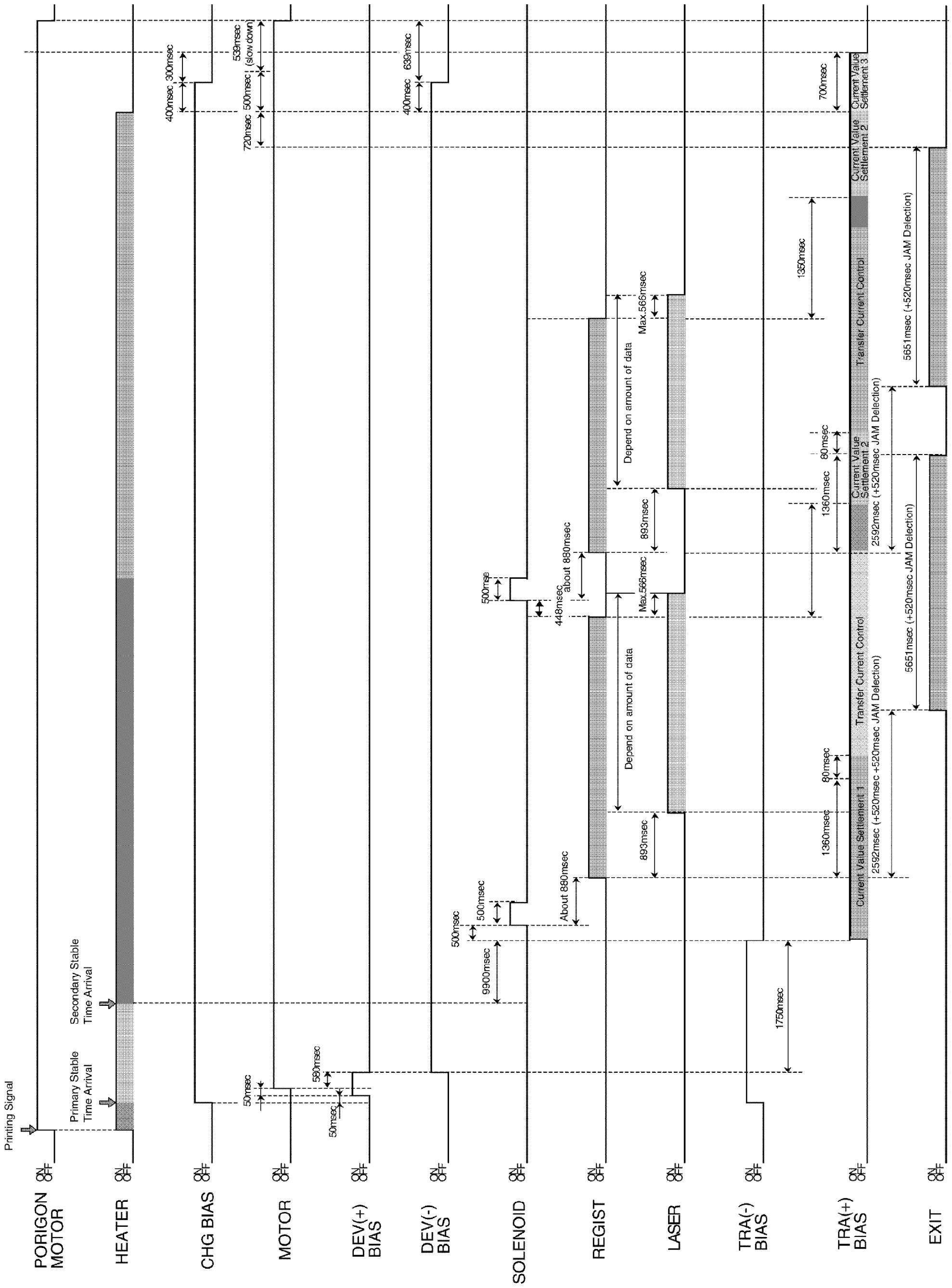


The fixing part becomes high temperature, so the thermistor and the thermal fuse are provided.

1. **Thermistor**
   The thermistor touches the heat roller and check the temperature to feed back to the control circuit. The surface temperature should be kept 178 °C while printing.
2. **The thermal fuse**
   The thermal fuse plays the role to prevent the heat roller from rising to abnormal high temperature. The thermal fuse is located near the heat roller and turns OFF the power when the temperature around the thermal fuse becomes over 121°C. Once the thermal fuse is turned OFF, it will not be turned ON again.
3. **Thermostat**
   The thermostat takes the same role with the thermal fuse. The thermostat is located near the heat roller, and it turns OFF the power when the temperature around the thermostat becomes over 135°C.


Heat Roller
Thermostat
Thermistor
Thermal Fuse

6.8. TIMING CHART (When Printing Two Sheets of Paper)


PORIGON MOTOR
HEATER
CHG BIAS
MOTOR
DEV(+) BIAS
DEV(-) BIAS
SOLENOID
REGIST
LASER
TRA(-) BIAS
TRA(+) BIAS
EXIT
ON
OFF
Printing Signal
Primary Stable Time Arrival
Secondary Stable Time Arrival
400msec
300msec
539msec
500msec (slow down)
720msec
639msec
50msec
580msec
9900msec
500msec
About 880msec
about 880msec
448msec
893msec
Max.566msec
Depend on amount of data
1750msec
1360msec
80msec
1350msec
700msec
Current Value Settlement 1
Transfer Current Control
Current Value Settlement 2
Current Value Settlement 3
2592msec (+520msec +520msec JAM Detection)
2592msec (+520msec JAM Detection)
5651msec (+520msec JAM Detection)

6.9. IMAGE READING

The Image Reading Part feeds and ejects the document when copying or scanning. The image reading part consists of the followings.

6.9.1. Automatic Document Feeder

The automatic document feeder consists of separation roller, document feed roller, separation pad, springs, etc. It divides the documents and transfers to the reading part, then stacks the documents on the document ejector when finished reading.

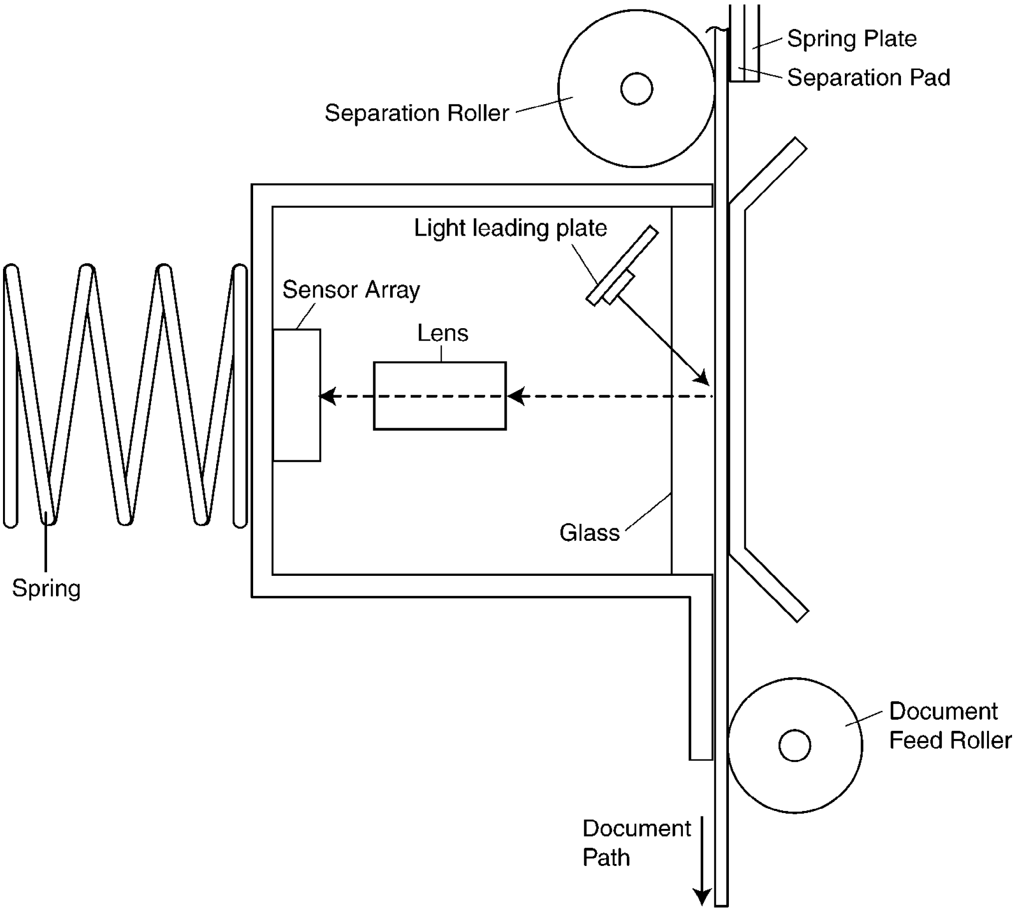
This automatic document feeder is affordable until 15 documents at once. When the user put a document on the document feeder and the top of the document is touched, the document detect sensor is turned ON and the motor is driven.

The driven motor feeds the document and transfers it a little. When the printing part is ready for

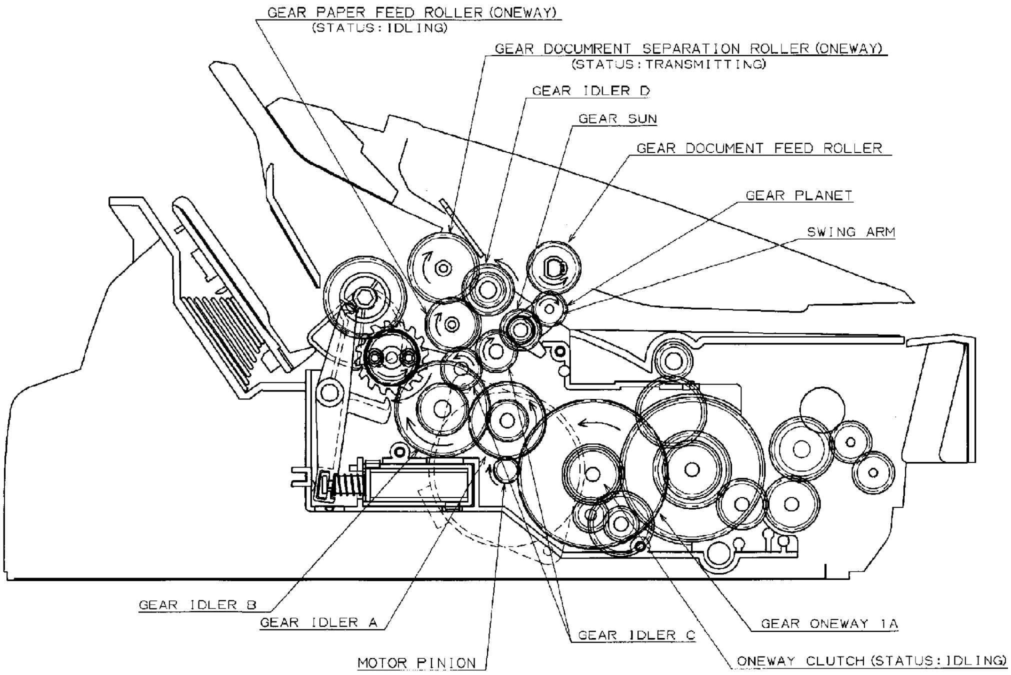
reading the document, the motor is driven again by the operation of the user to move the roller at a fixed speed. The documents are fed one by one separated by the separation pad. The spring plate adds the pressure to the document so that the separation pad can separate the documents properly. spring plate helps the document endure the pressure of separation pad to be fed smoothly. The document is ejected document stacker.

6.9.2. CIS (Contact Image Scanner)

CIS consists of LED, lens and sensor array. When the light emitted from LED is reflected on the document, the light reaches the sensor through the lens, then the sensor array detects the document.


Spring Plate
Separation Pad
Separation Roller
Light leading plate
Sensor Array
Lens
Glass
Spring
Document Feed Roller
Document Path

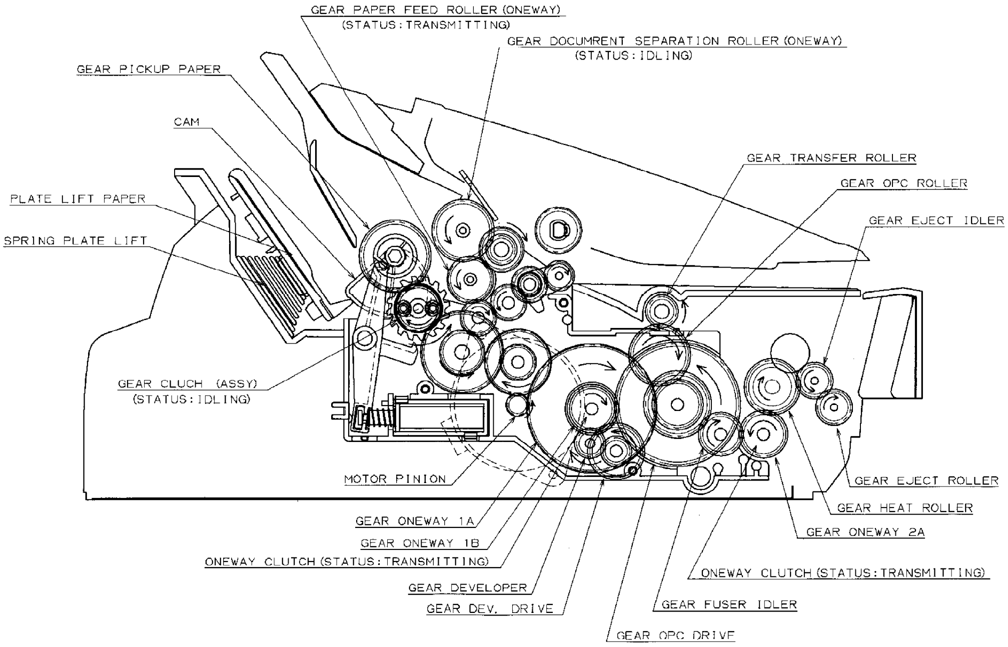
6.10. DOCUMENT TRANSMISSION


GEAR PAPER FEED ROLLER (ONEWAY)
(STATUS: IDLING)
GEAR DOCUMRENT SEPARATION ROLLER (ONEWAY)
(STATUS: TRANSMITTING)
GEAR IDLER D
GEAR SUN
GEAR DOCUMENT FEED ROLLER
GEAR PLANET
SWING ARM
GEAR IDLER B
GEAR IDLER A
MOTOR PINION
GEAR IDLER C
GEAR ONEWAY 1A
ONEWAY CLUTCH (STATUS: IDLING)

Document feeding mode

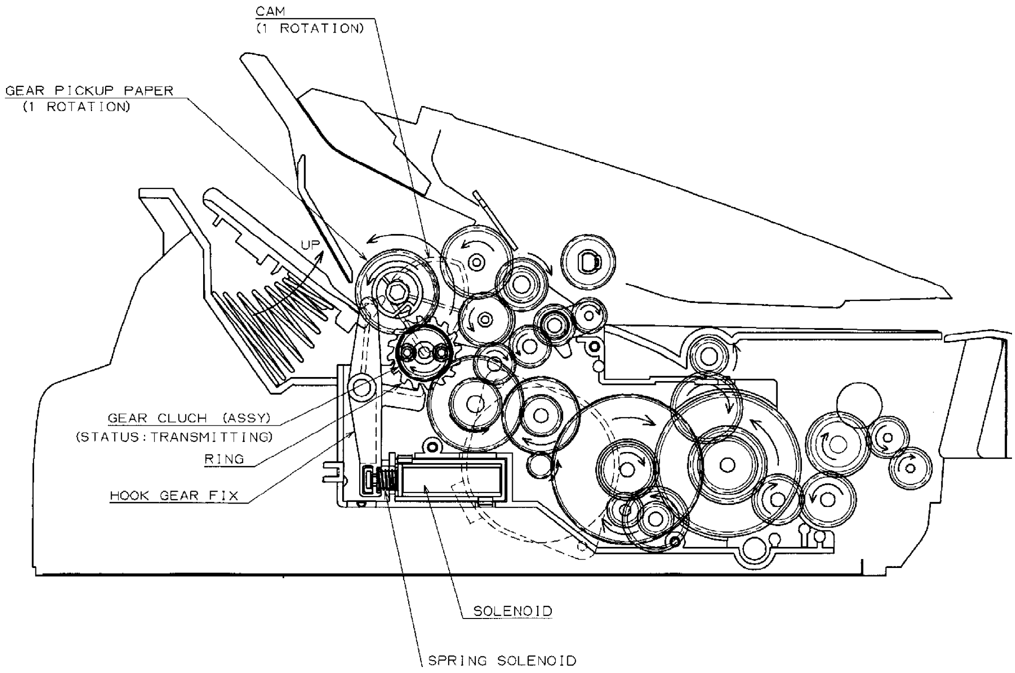
- **The motor pinion rotates in the direction shown in the figure.**
- **Although the GEAR ONEWAY 1A rotates, built-in ONEWAY CLUTCH disturbs to transfer the driving power to the next gear.**
- **The FEED ROLLER and SEPARATION ROLLER perform feeding and separating the documents.**
- **The GEAR PAPER FEED ROLLER runs idle and PAPER FEED ROLLER is still.**

6.11. PRINTING


GEAR PAPER FEED ROLLER (ONEWAY)
(STATUS:TRANSMITTING)
GEAR DOCUMRENT SEPARATION ROLLER (ONEWAY)
(STATUS:IDLING)
GEAR PICKUP PAPER
CAM
GEAR TRANSFER ROLLER
GEAR OPC ROLLER
PLATE LIFT PAPER
GEAR EJECT IDLER
SPRING PLATE LIFT
GEAR CLUCH (ASSY)
(STATUS:IDLING)
MOTOR PINION
GEAR EJECT ROLLER
GEAR HEAT ROLLER
GEAR ONEWAY 1A
GEAR ONEWAY 2A
GEAR ONEWAY 1B
ONEWAY CLUTCH (STATUS:TRANSMITTING)
ONEWAY CLUTCH (STATUS:TRANSMITTING)
GEAR DEVELOPER
GEAR DEV. DRIVE
GEAR FUSER IDLER
GEAR OPC DRIVE

- **The motor pinion rotates in the direction shown in the figure.**
- **The gears of fixing and developing parts are driven by the GEAR ONEWAY 1A.**
- **The GEAR PLANET is separated from the GEAR DOCUMENT FEED ROLLER.**
- **The GEAR DOCUMENT SEPARATION ROLLER runs idle and does not transfer the driving power to the roller.**
- **The GEAR PAPER FEED ROLLER drives the roller.**
- **The GEAR CLUTCH runs idle and GEAR PICKUP PAPER is still.**

6.12. PAPER PICKUP

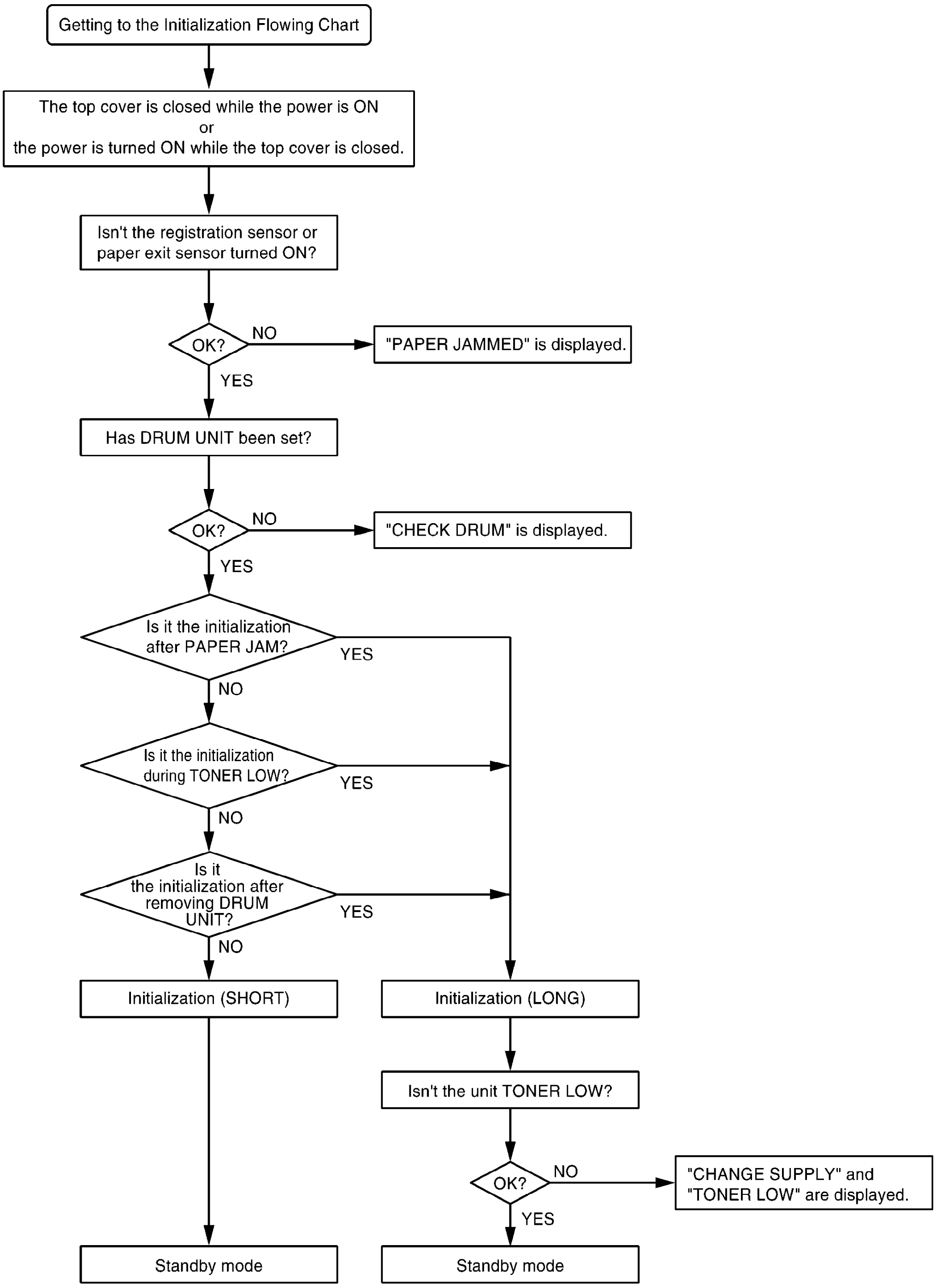

CAM
(1 ROTATION)
GEAR PICKUP PAPER
(1 ROTATION)
UP
GEAR CLUCH (ASSY)
(STATUS:TRANSMITTING)
RING
HOOK GEAR FIX
SOLENOID
SPRING SOLENOID

During printing

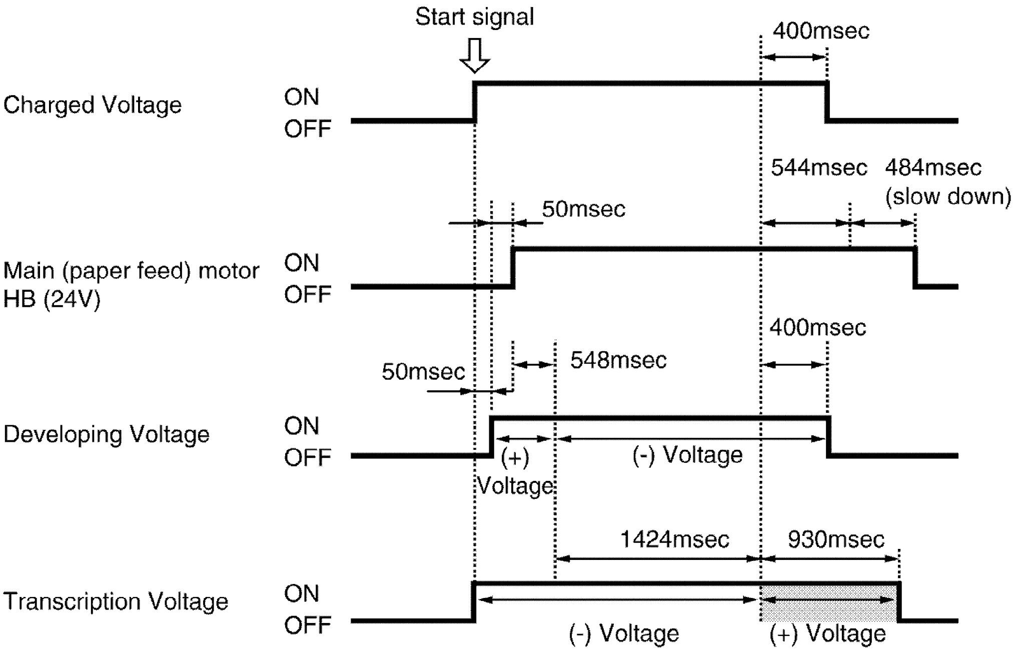
- **When the SOLENOID is turned ON, the HOOK GEAR FIX is hooked on the RING of GEAR CLUTCH. It causes the GEAR PICKUP PAPER to rotate.**
- **At the same time, CAM's rotation lifts up the PLATE LIFT PAPER. The recording paper is pressed by the PICKUP ROLLER and the top paper is separated and fed. Then the PLATE LIFT PAPER is pressed down.**
- **Even the SOLENOID is turned OFF, it can not stop on the way of a turn because the tip of HOOK GEAR FIX is on the CAM of GEAR PICKUP PAPER.**
- **When the tip of HOOK GEAR FIX returns to CAM's home position, the GEAR CLUTCH RING is unhooked, then the GEAR PICKUP PAPER is stopped.**

6.13. INITIALIZATION

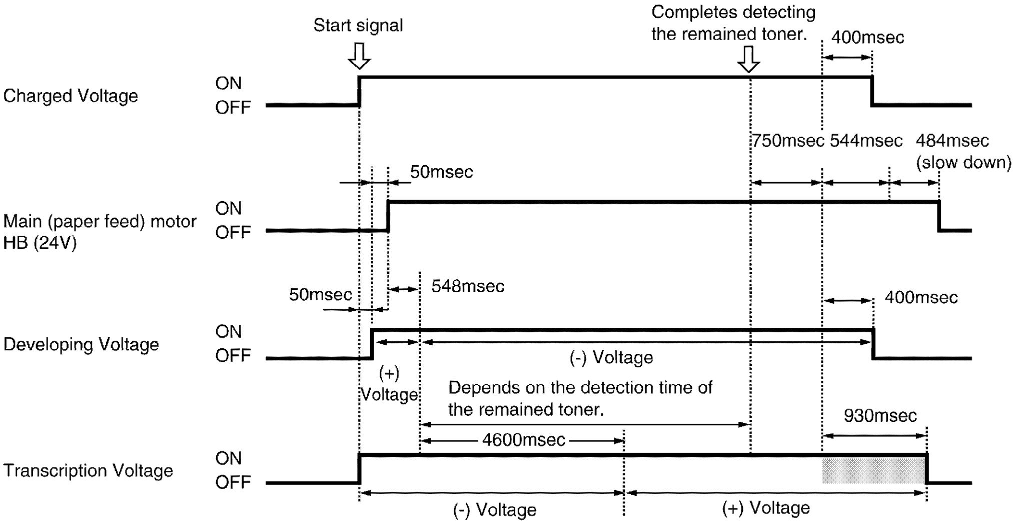
There are two types of initialization, one is the short initialization (about 3 seconds) and the other is the long initialization (about 10 seconds). The short initialization makes the unit enter the standby mode. The long initialization makes the unit enter the standby mode after cleaning or detecting the rest of toner.


Getting to the Initialization Flowing Chart
The top cover is closed while the power is ON or the power is turned ON while the top cover is closed.
Isn't the registration sensor or paper exit sensor turned ON?
OK?
NO
"PAPER JAMMED" is displayed.
YES
Has DRUM UNIT been set?
OK?
NO
"CHECK DRUM" is displayed.
YES
Is it the initialization after PAPER JAM?
YES
NO
Is it the initialization during TONER LOW?
YES
NO
Is it the initialization after removing DRUM UNIT?
YES
NO
Initialization (SHORT)
Initialization (LONG)
Isn't the unit TONER LOW?
OK?
NO
"CHANGE SUPPLY" and "TONER LOW" are displayed.
YES
Standby mode
Standby mode

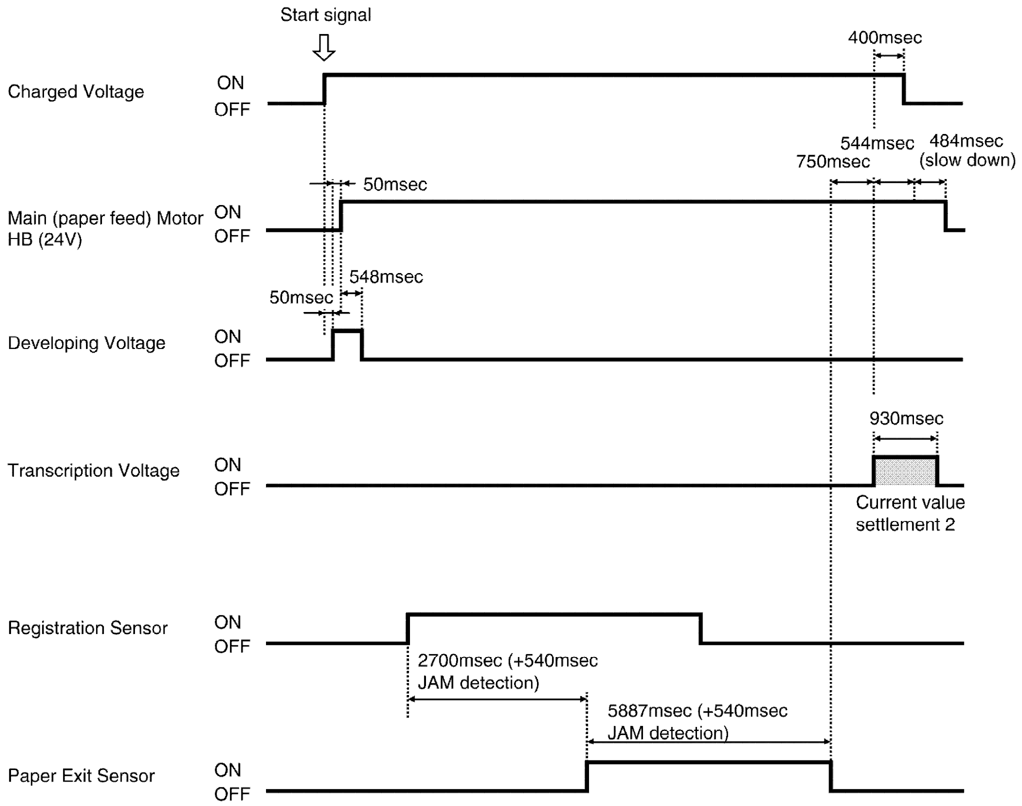
6.14. Timing Chart [Initializing (Short)]


Start signal
400msec
Charged Voltage
ON
OFF
544msec
484msec
(slow down)
50msec
Main (paper feed) motor
HB (24V)
ON
OFF
400msec
50msec
548msec
Developing Voltage
ON
OFF
(+)
Voltage
(-) Voltage
1424msec
930msec
Transcription Voltage
ON
OFF
(-) Voltage
(+) Voltage

6.15. Timing Chart [Initializing (Long)]


Start signal
Completes detecting
the remained toner.
400msec
Charged Voltage
ON
OFF
750msec
544msec
484msec
(slow down)
50msec
Main (paper feed) motor
HB (24V)
ON
OFF
50msec
548msec
400msec
Developing Voltage
ON
OFF
(-) Voltage
(+)
Voltage
Depends on the detection time of
the remained toner.
930msec
4600msec
Transcription Voltage
ON
OFF
(-) Voltage
(+) Voltage

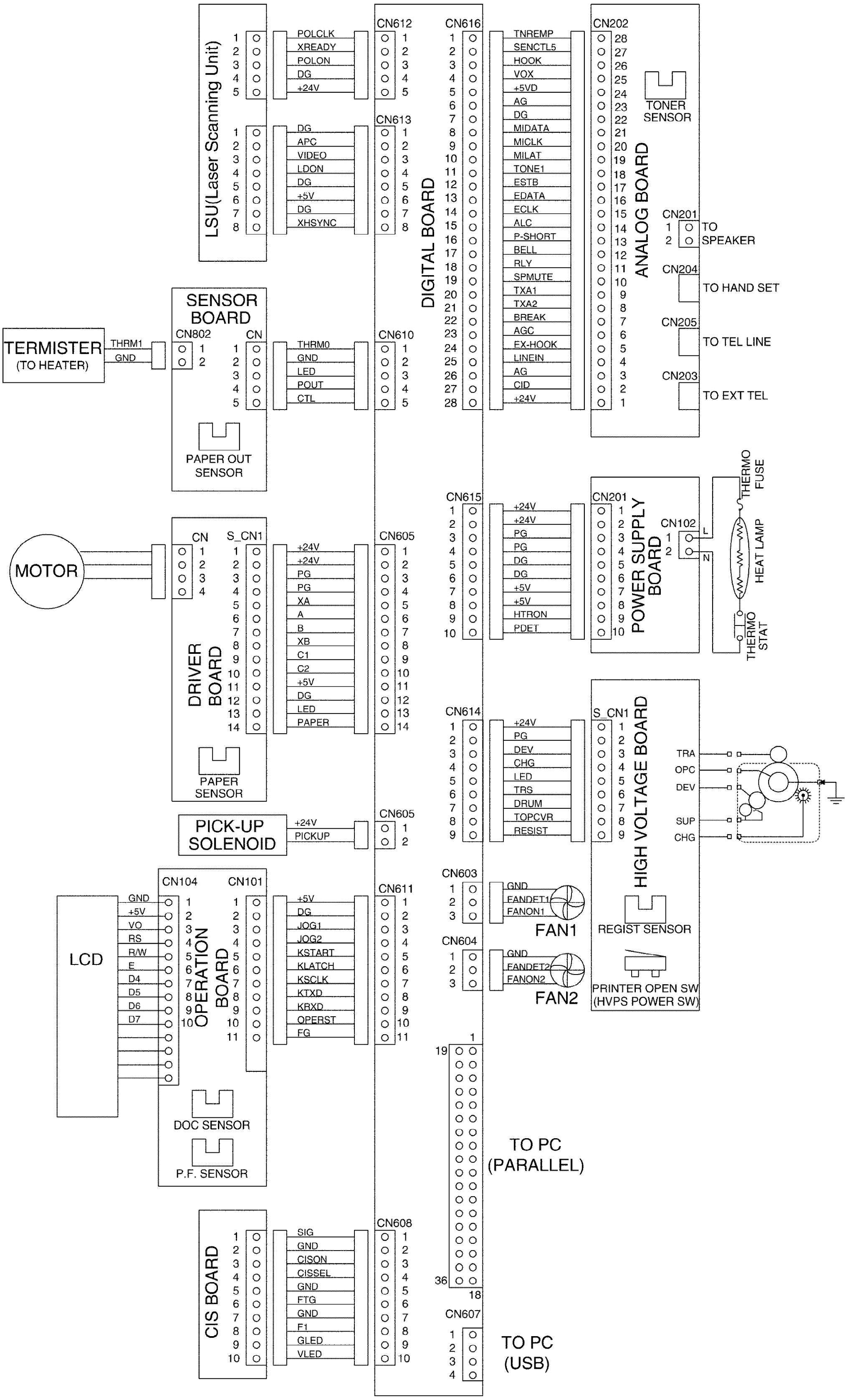
6.16. Timing Chart (when the registration sensor is turned OFF then ON during initializing)


Start signal
400msec
Charged Voltage
ON
OFF
544msec
750msec
484msec
(slow down)
50msec
Main (paper feed) Motor HB (24V)
ON
OFF
548msec
50msec
Developing Voltage
ON
OFF
930msec
Transcription Voltage
ON
OFF
Current value settlement 2
Registration Sensor
ON
OFF
2700msec (+540msec JAM detection)
5887msec (+540msec JAM detection)
Paper Exit Sensor
ON
OFF

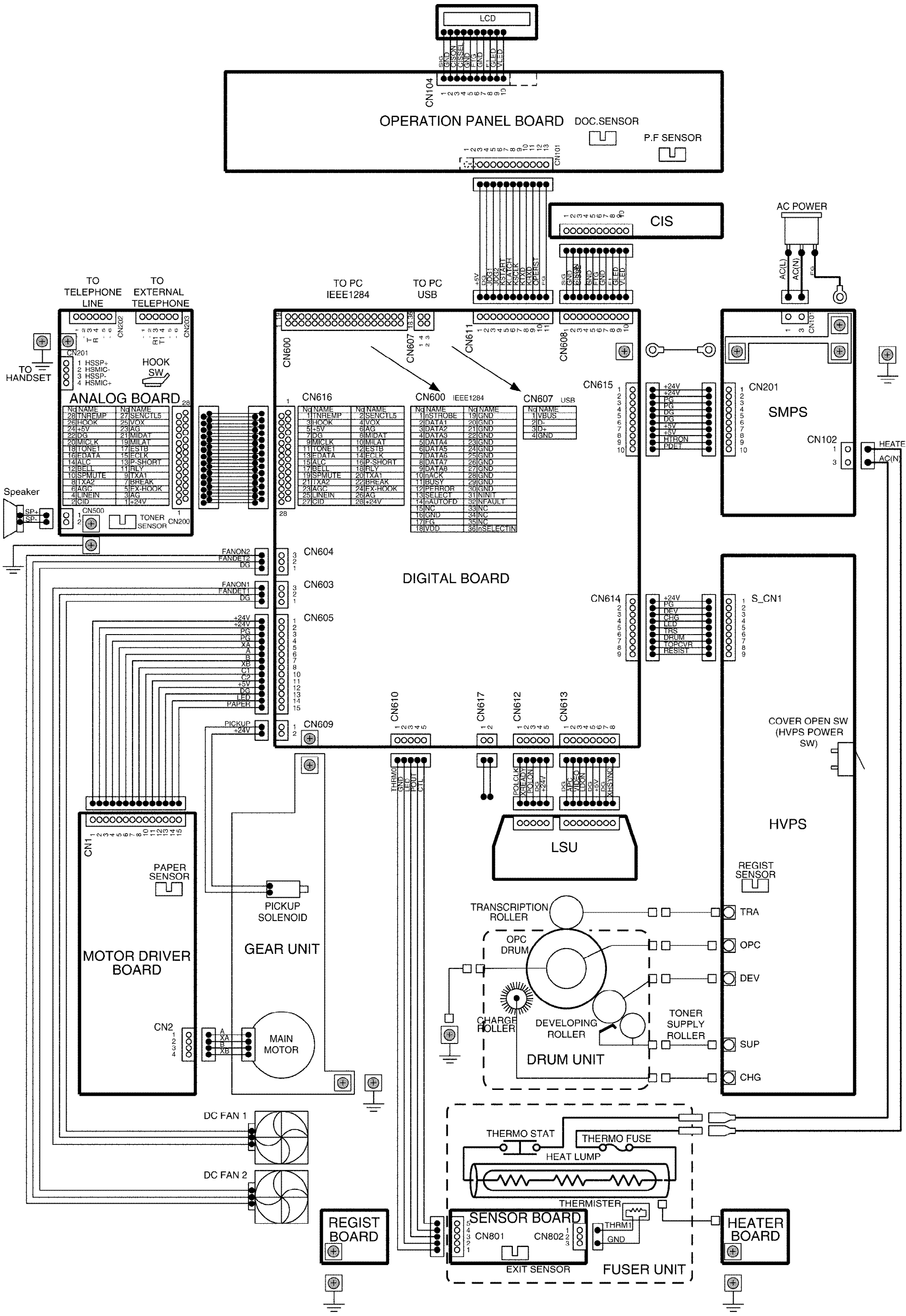
7. CIRCUIT OPERATIONS

7.1. CONNECTION DIAGRAM

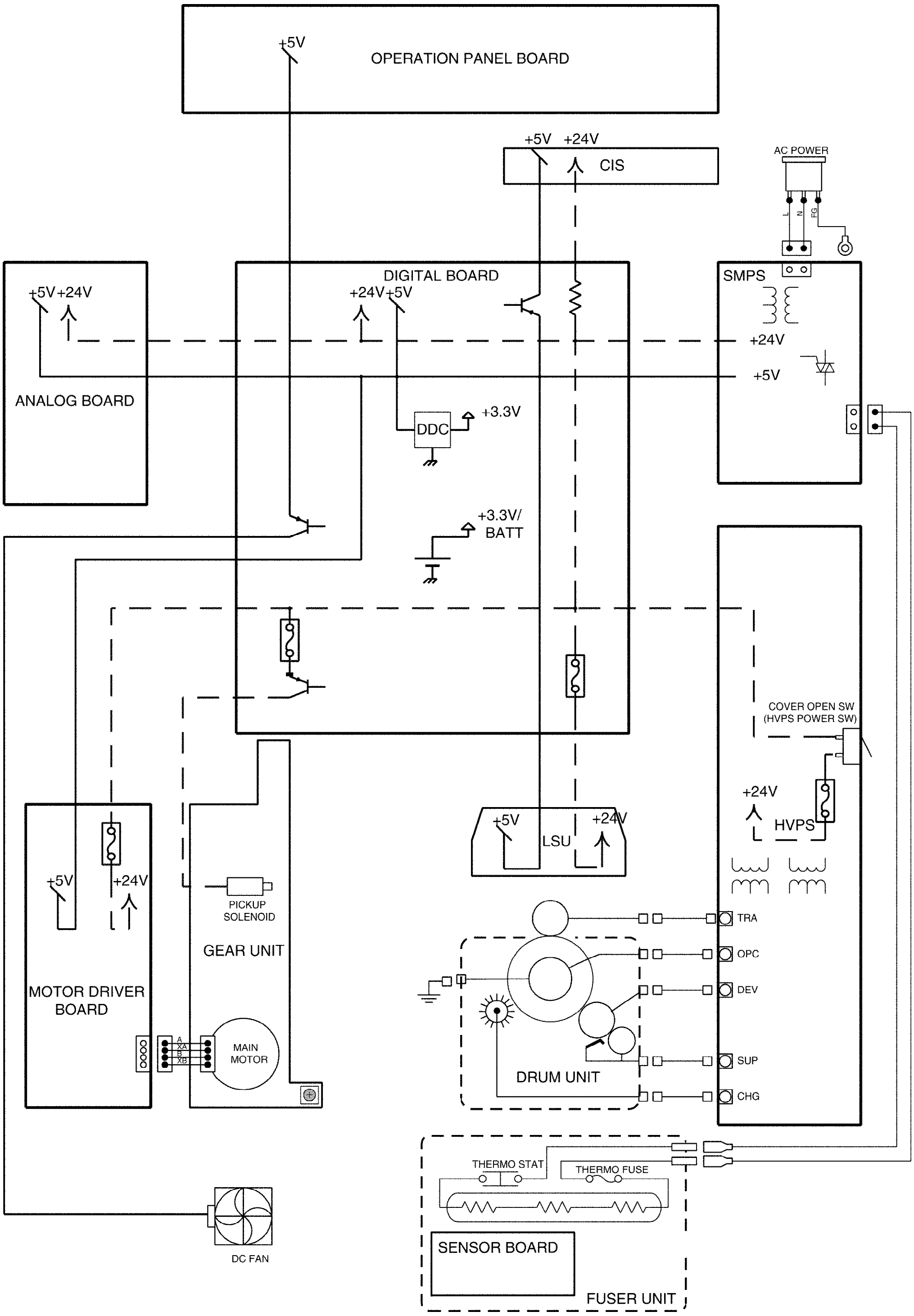
7.1.1. CONNECTION DIAGRAM (1)


LSU(Laser Scanning Unit)
POLCLK
XREADY
POLON
DG
+24V
DG
APC
VIDEO
LDON
DG
+5V
DG
XHSYNC
CN612
CN613
CN616
DIGITAL BOARD
TNREMP
SENCTL5
HOOK
VOX
+5VD
AG
DG
MIDATA
MICLK
MILAT
TONE1
ESTB
EDATA
ECLK
ALC
P-SHORT
BELL
RLY
SPMUTE
TXA1
TXA2
BREAK
AGC
EX-HOOK
LINEIN
AG
CID
+24V
CN202
ANALOG BOARD
TONER SENSOR
CN201
TO SPEAKER
CN204
TO HAND SET
CN205
TO TEL LINE
CN203
TO EXT TEL
SENSOR BOARD
CN802
CN
TERMISTER
(TO HEATER)
THRM1
GND
THRM0
GND
LED
POUT
CTL
CN610
PAPER OUT SENSOR
CN615
+24V
+24V
PG
PG
DG
DG
+5V
+5V
HTRON
PDET
CN201
POWER SUPPLY BOARD
CN102
L
N
THERMO FUSE
HEAT LAMP
THERMO STAT
MOTOR
CN
S_CN1
DRIVER BOARD
+24V
+24V
PG
PG
XA
A
B
XB
C1
C2
+5V
DG
LED
PAPER
CN605
PAPER SENSOR
CN614
+24V
PG
DEV
CHG
LED
TRS
DRUM
TOPCVR
RESIST
S_CN1
HIGH VOLTAGE BOARD
TRA
OPC
DEV
SUP
CHG
PICK-UP SOLENOID
+24V
PICKUP
CN605
CN603
GND
FANDET1
FANON1
FAN1
REGIST SENSOR
CN604
GND
FANDET2
FANON2
FAN2
PRINTER OPEN SW
(HVPS POWER SW)
LCD
GND
+5V
VO
RS
R/W
E
D4
D5
D6
D7
CN104
CN101
OPERATION BOARD
+5V
DG
JOG1
JOG2
KSTART
KLATCH
KSCLK
KTXD
KRXD
OPERST
FG
CN611
DOC SENSOR
P.F. SENSOR
TO PC
(PARALLEL)
CIS BOARD
SIG
GND
CISON
CISSEL
GND
FTG
GND
F1
GLED
VLED
CN608
CN607
TO PC
(USB)

7.1.2. CONNECTION DIAGRAM (2)


LCD
CN104
OPERATION PANEL BOARD
DOC.SENSOR
P.F SENSOR
CN101
CIS
AC POWER
AC(L)
AC(N)
FG
TO TELEPHONE LINE
TO EXTERNAL TELEPHONE
CN202
CN203
CN201
HSSP+
HSMIC-
HSSP-
HSMIC+
HOOK SW
TO HANDSET
ANALOG BOARD
Speaker
SP+
SP-
CN500
TONER SENSOR
CN200
TO PC IEEE1284
TO PC USB
CN600
CN607
CN611
CN608
CN616
CN615
CN604
CN603
CN605
CN609
CN614
CN610
CN617
CN612
CN613
DIGITAL BOARD
SMPS
CN201
CN102
HEATER
AC(N)
S_CN1
COVER OPEN SW (HVPS POWER SW)
HVPS
REGIST SENSOR
FANON2
FANDET2
FANON1
FANDET1
DG
+24V
PG
XA
A
B
XB
C1
C2
+5V
LED
PAPER
PICKUP
CN1
PAPER SENSOR
MOTOR DRIVER BOARD
CN2
PICKUP SOLENOID
GEAR UNIT
MAIN MOTOR
LSU
TRANSCRIPTION ROLLER
OPC DRUM
CHARGE ROLLER
DEVELOPING ROLLER
TONER SUPPLY ROLLER
DRUM UNIT
TRA
OPC
DEV
SUP
CHG
DC FAN 1
DC FAN 2
THERMO STAT
THERMO FUSE
HEAT LUMP
THERMISTER
SENSOR BOARD
CN801
CN802
THRM1
GND
EXIT SENSOR
FUSER UNIT
REGIST BOARD
HEATER BOARD

7.1.3. POWER SUPPLY FLOW


OPERATION PANEL BOARD
+5V
+5V
+24V
CIS
AC POWER
L
N
FG
SMPS
+24V
+5V
DIGITAL BOARD
+24V
+5V
ANALOG BOARD
+5V
+24V
DDC
+3.3V
+3.3V/
BATT
COVER OPEN SW
(HVPS POWER SW)
+24V
HVPS
+5V
LSU
+24V
+5V
+24V
MOTOR DRIVER
BOARD
PICKUP
SOLENOID
GEAR UNIT
A
XA
B
XB
MAIN
MOTOR
TRA
OPC
DEV
SUP
CHG
DRUM UNIT
THERMO STAT
THERMO FUSE
SENSOR BOARD
FUSER UNIT
DC FAN

7.2. GENERAL BLOCK DIAGRAM

The following is an outline of each device IC on the digital board.

1. ASIC (IC604)

Composed mainly of an address decoder and a modem control.

Controls the general FAX operations.
Performs the image processing.
CPU and Real time clock
Provides the reset pulse for each of the major ICs.

2. G/A (IC610)
Controls the operation panel I/F.
Controls the LSU I/F.
Latches lower address.
Controls FANs, LEDs and analog I/F.

3. Flash ROM (IC606)
Contains all of the program instructions on the unit operations.

4. Synchronous Dynamic RAM
4-1. (IC608) This memory is used for the parameter working in the storage area and for the page memory.
4-2. (IC603) This memory is used for image processing.

5. CODEC (IC609)
Performs the modulation and the demodulation for FAX communication.

6. Read Section
CIS image sensor to read transmitted documents.

7. Motor Driver Board
Drives the motor.

8. LSU (Laser Scanning Unit)
Forms the images on the OPC drum by rotating polygon motor and reflecting the laser beam against polygon.

9. Analog Board
Composed of ITS circuit and NCU circuit.

10. Sensor Section
Composed of a cover open switch, a document sensor, a document top sensor, a paper sensor, a paper regist sensor, a paper exit sensor and a toner sensor.

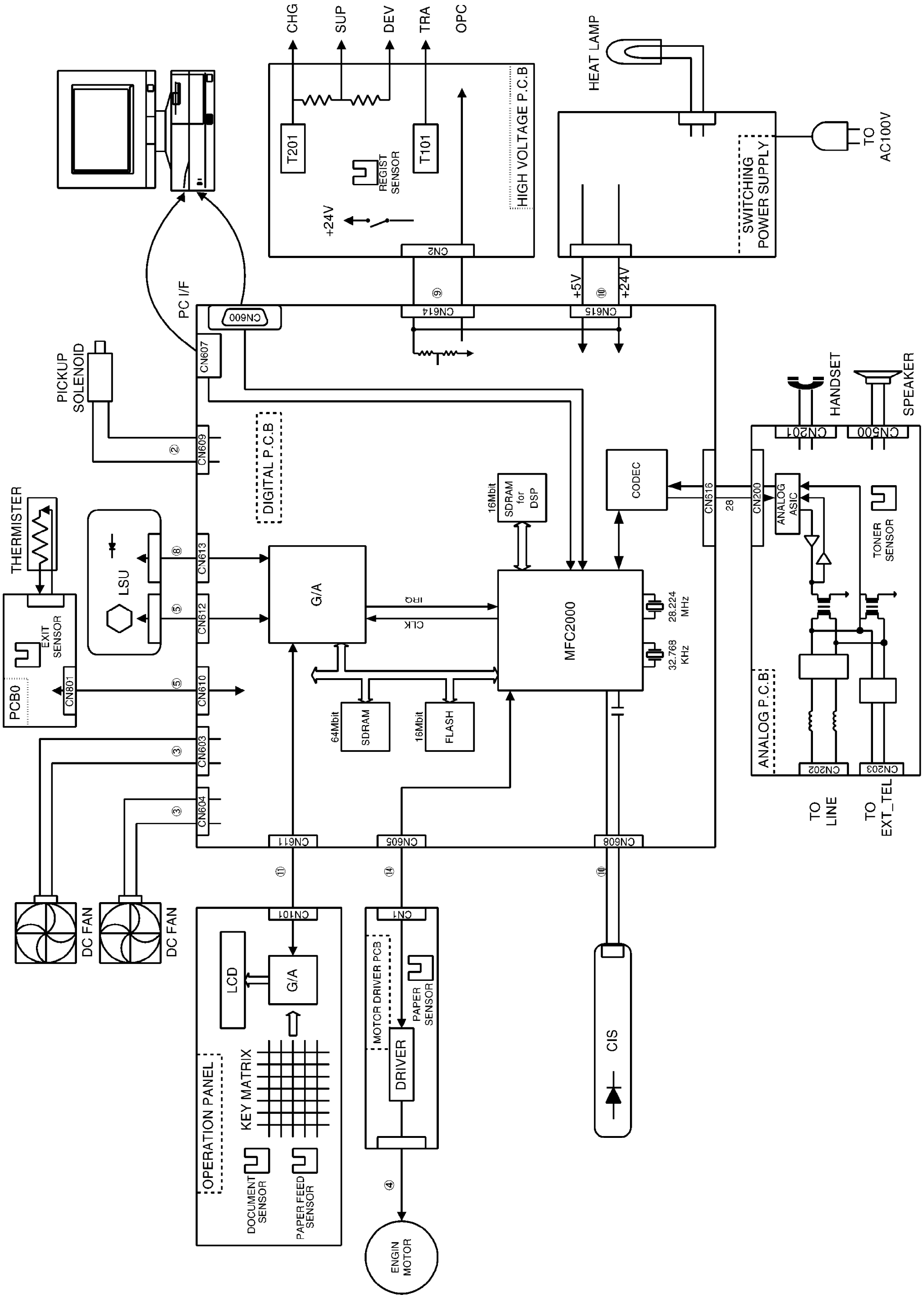
11. Power Supply Board Switching Section
Supplies +5V and +24V to the unit.

12. High Voltage Power Supply Board

Supplies bias need for the printing operation: bias of the Drum, developing and transcription.

13. Fixing Unit

Composed heat lamp, thermistor and thermal fuse.



CHG
SUP
DEV
TRA
OPC
HEAT LAMP
T201
T101
REGIST SENSOR
HIGH VOLTAGE P.C.B
+24V
CN2
SWITCHING POWER SUPPLY
TO AC100V
+5V
+24V
⑥
⑩
CN614
CN615
CN600
PC I/F
CN607
PICKUP SOLENOID
CN609
②
DIGITAL P.C.B
THERMISTOR
EXIT SENSOR
PCB0
CN801
LSU
CN613
⑧
CN612
⑤
CN610
⑤
CN603
③
CN604
③
G/A
IRQ
CLK
MFC2000
16Mbit SDRAM for DSP
CODEC
CN616
28
CN200
ANALOG ASIC
TONER SENSOR
HANDSET
SPEAKER
CN201
CN500
28.224 MHz
32.768 KHz
64Mbit SDRAM
16Mbit FLASH
ANALOG P.C.B
CN202
CN203
TO LINE
TO EXT_TEL
CN611
CN605
CN608
⑪
⑭
⑩
DC FAN
DC FAN
CN101
LCD
G/A
KEY MATRIX
OPERATION PANEL
DOCUMENT SENSOR
PAPER FEED SENSOR
CN1
MOTOR DRIVER PCB
PAPER SENSOR
DRIVER
④
ENGIN MOTOR
CIS

7.3. FACSIMILE SECTION

7.3.1. DIGITAL SECTION

7.3.1.1. DIGITAL BLOCK DIAGRAM

7.3.1.2. ASIC (IC604)

This IC is used for general FAX operations.

(1)	**CPU:**	**This model uses ARM equivalent CPU operating at 40 MHz. Many of the peripheral functions are handled by custom designed LSIs. As a result, the CPU only needs to process the results.**
(2)	**RTC:**	**Real time clock.**
(3)	**DECORDER:**	**Decords the address.**
(4)	**ROM/RAM I/F:**	**Controls the SELECT signal of ROM or RAM and bank switching.**
(5)	**ANALOG UNIT:**	**Sends beep tones, etc.**

7.3.1.3. ROM (IC606)

This 2MB FLASH ROM has 31 blocks.
The capacity of each block is 64 KB.
The addresses of the this area are from 000000H to 1FFFFFH.

7.3.1.4. GATE ARRAY (IC610)

This custom IC is used as folloning.
(1) LSU I/F Control the polygon motor and output video signal to LSU.
(2)OPERATION PANEL I/F Serial interface with operation panal.
(3) FAN MOTOR I/F Control FAN MOTOR and detect the rotation of FAM MOTOR.
(4) ANALOG I/F Serial interface for analog ASIC and electrical volume.
(5) I/O PORT I/O Port Interface.

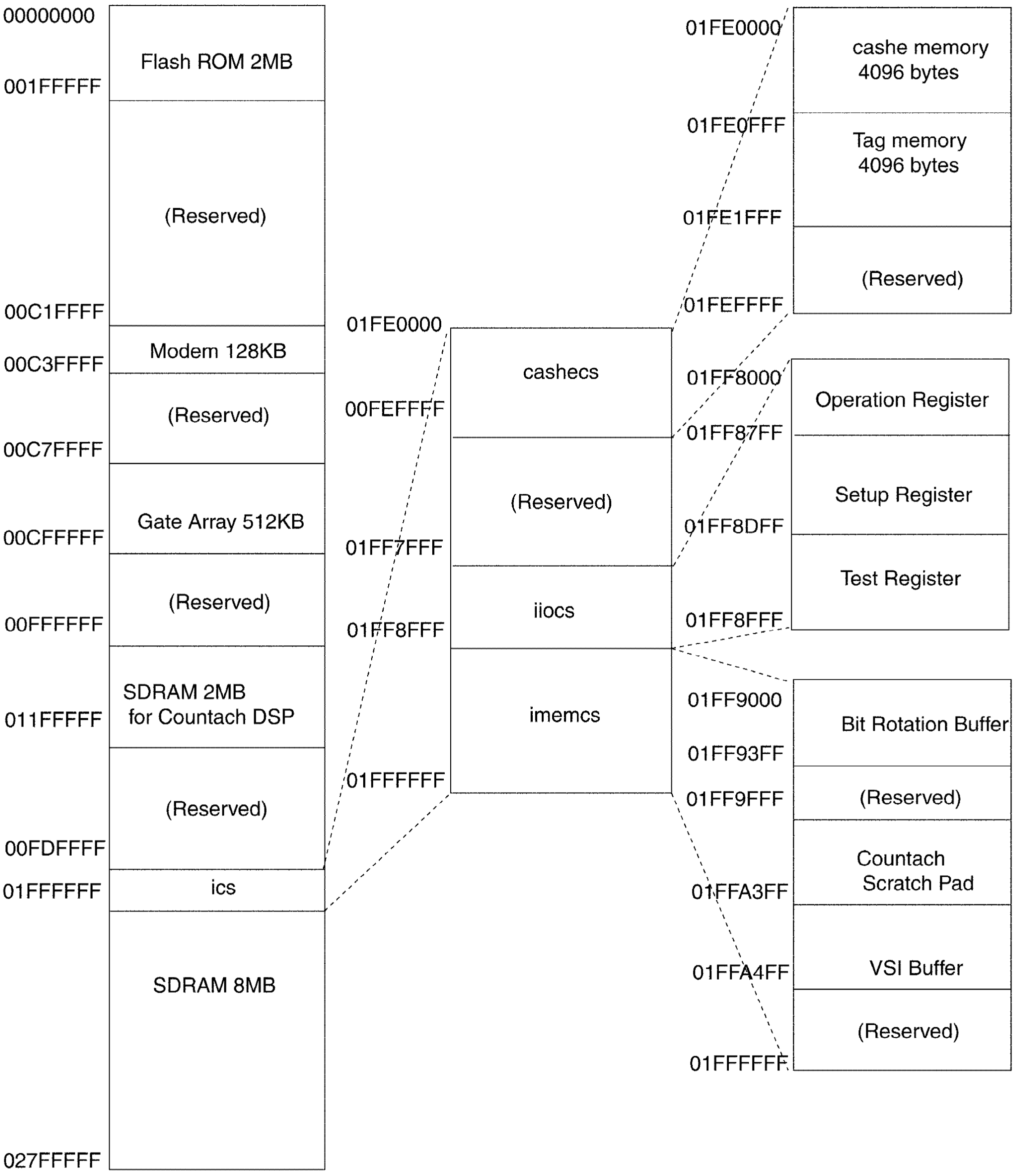
7.3.1.5. SYNCHRONOUS DYNAMIC RAM (IC608)

This SDRAM is used for CPU work and receiving memory and page memory.
The address are from 200000H to 27FFFFFH.

7.3.1.6. SYNCHRONOUS DYNAMIC RAM (IC603)

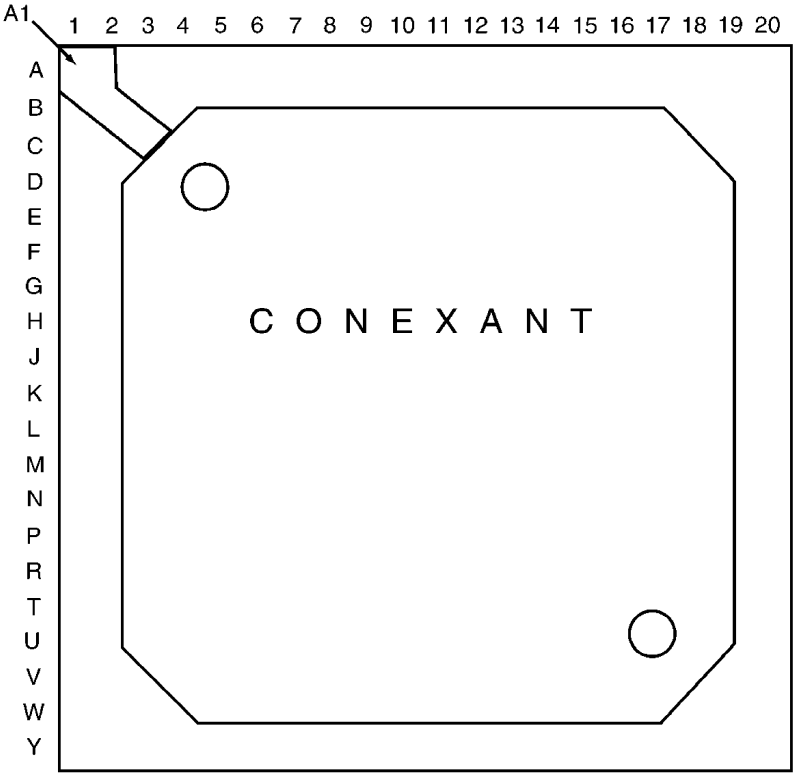
The SDRAM is used for Image Processing work memory.
This address are from 1000000H to 11FFFFFH.

7.3.2. MEMORY MAP

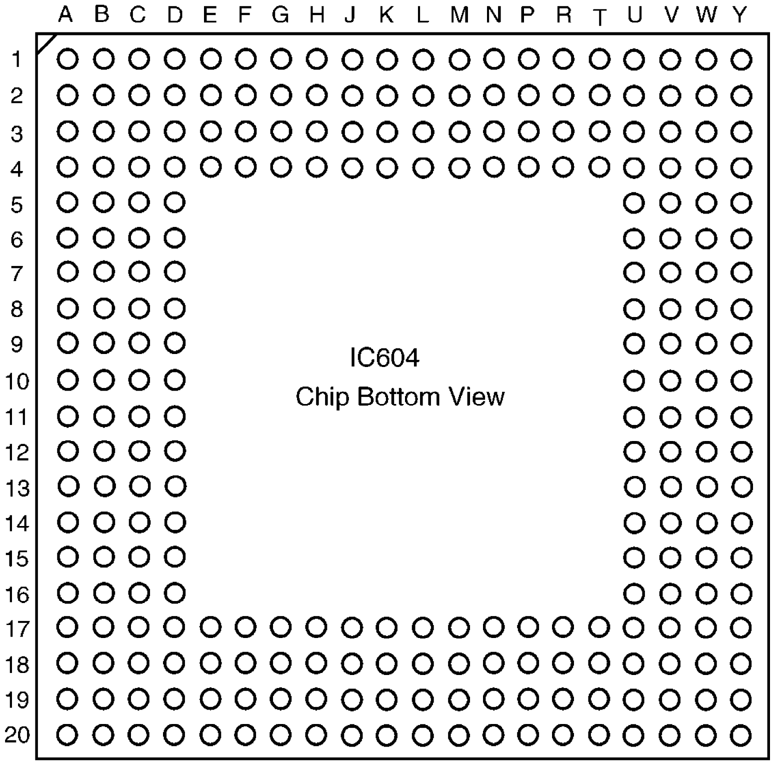

00000000
Flash ROM 2MB
001FFFFF
(Reserved)
00C1FFFF
Modem 128KB
00C3FFFF
(Reserved)
00C7FFFF
Gate Array 512KB
00CFFFFF
(Reserved)
00FFFFFF
SDRAM 2MB
for Countach DSP
011FFFFF
(Reserved)
00FDFFFF
ics
01FFFFFF
SDRAM 8MB
027FFFFF
01FE0000
00FEFFFF
01FF7FFF
01FF8FFF
01FFFFFF
cashecs
(Reserved)
iiocs
imemcs
01FE0000
01FE0FFF
01FE1FFF
01FEFFFF
cashe memory
4096 bytes
Tag memory
4096 bytes
(Reserved)
01FF8000
01FF87FF
01FF8DFF
01FF8FFF
Operation Register
Setup Register
Test Register
01FF9000
01FF93FF
01FF9FFF
01FFA3FF
01FFA4FF
01FFFFFF
Bit Rotation Buffer
(Reserved)
Countach
Scratch Pad
VSI Buffer
(Reserved)

7.3.2.1. ASIC (IC604) PIN LAYOUT

Top View


A1
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
T
U
V
W
Y
CONEXANT

Bottom View


A
B
C
D
E
F
G
H
J
K
L
M
N
P
R
T
U
V
W
Y
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
IC604
Chip Bottom View

7.3.2.2. EXPLANATION OF PIN DISTRIBUTION

7.3.2.2.1. (IC604)

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
D18	A[0]	O	3.3V	SYSTEM ADDRESS BUS 0
D19	A[1]	O	3.3V	SYSTEM ADDRESS BUS 1
D20	A[2]	O	3.3V	SYSTEM ADDRESS BUS 2
C17	A[3]	O	3.3V	SYSTEM ADDRESS BUS 3
C18	A[4]	O	3.3V	SYSTEM ADDRESS BUS 4
C19	A[5]	O	3.3V	SYSTEM ADDRESS BUS 5
C20	A[6]	O	3.3V	SYSTEM ADDRESS BUS 6
B17	A[7]	O	3.3V	SYSTEM ADDRESS BUS 7
B18	A[8]	O	3.3V	SYSTEM ADDRESS BUS 8
B19	A[9]	O	3.3V	SYSTEM ADDRESS BUS 9
B20	A[10]	O	3.3V	SYSTEM ADDRESS BUS 1
A20	A[11]	O	3.3V	SYSTEM ADDRESS BUS 11
B16	D[0]	I/O	3.3V	SYSTEM DATA BUS 0
A16	D[1]	I/O	3.3V	SYSTEM DATA BUS 1
D15	D[2]	I/O	3.3V	SYSTEM DATA BUS 2
C15	D[3]	I/O	3.3V	SYSTEM DATA BUS 3
B15	D[4]	I/O	3.3V	SYSTEM DATA BUS 4
A15	D[5]	I/O	3.3V	SYSTEM DATA BUS 5
C14	D[6]	I/O	3.3V	SYSTEM DATA BUS 6
B14	D[7]	I/O	3.3V	SYSTEM DATA BUS 7
A14	D[8]	I/O	3.3V	SYSTEM DATA BUS 8
D13	D[9]	I/O	3.3V	SYSTEM DATA BUS 9
C13	D[10]	I/O	3.3V	SYSTEM DATA BUS 10
B13	D[11]	I/O	3.3V	SYSTEM DATA BUS 11
A13	D[12]	I/O	3.3V	SYSTEM DATA BUS 12
C12	D[13]	I/O	3.3V	SYSTEM DATA BUS 13
B12	D[14]	I/O	3.3V	SYSTEM DATA BUS 14
A12	D[15]	I/O	3.3V	SYSTEM DATA BUS 15
D12	RDn	O	3.3V	SYSTEM READ SIGNAL
B9	WREn	O	3.3V	SYSTEM WRITE SIGNAL (f byte)
C9	WROn	O	3.3V	SYSTEM WRITE SIGNAL (f byte)
D10	ROMCSn	O	3.3V	ROM CHIP SELECT
G18	CS[0]n	O	3.3V	NOT USED
A9	CS[1]n	O	3.3V	NOT USED
F19	RASn[1]	O	3.3V	NOT USED
F18	RASn[0]	O	3.3V	ARM SDRAM(IC608) CONT SIGNAL
F20	CASOn[0]	O	3.3V	ARM SDRAM(IC608) CONT SIGNAL

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
E17	**CASOn[1]**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
E19	**CASEn[0]**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
E20	**CASEn[1]**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
D17	**DWRn**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
A19	**ROM_CONFIG[0]/SA[12]**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
A18	**ROM_CONFIG[1]/SA[13]**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
A17	**CLK_CONFIG[0]/SDQM0**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
D16	**CLK_CONFIG[1]/SDQM1**	**O**	**3.3V**	**ARM SDRAM(IC608) CONTI SIGNAL**
U19	**SDDATA[0]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
U18	**SDDATA[1]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
U17	**SDDATA[2]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
T20	**SDDATA[3]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
T19	**SDDATA[4]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
T18	**SDDATA[5]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
T17	**SDDATA[6]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
R20	**SDDATA[7]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
R19	**SDDATA[8]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
R18	**SDDATA[9]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
R17	**SDDATA[10]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
P20	**SDDATA[11]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
P19	**SDDATA[12]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
P18	**SDDATA[13]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
P17	**SDDATA[14]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
N20	**SDDATA[15]**	**I/O**	**3.3V**	**DSP SDRAM(IC603) DATA I**
V15	**SDADDR[0]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 0**
Y16	**SDADDR[1]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 1**
W16	**SDADDR[2]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 2**
V16	**SDADDR[3]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 3**
Y17	**SDADDR[4]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 4**
W17	**SDADDR[5]**	**O**	**3.3V**	**DSP SDRAM(IC603) ADDRE 5**

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
Y18	SDADDR[6]	O	3.3V	DSP SDRAM(IC603) ADDRE 6
W18	SDADDR[7]	O	3.3V	DSP SDRAM(IC603) ADDRE 7
Y19	SDADDR[8]	O	3.3V	DSP SDRAM(IC603) ADDRE 8
W19	SDADDR[9]	O	3.3V	DSP SDRAM(IC603) ADDRE 9
Y20	SDADDR[10]	O	3.3V	DSP SDRAM(IC603) ADDRE 10
W20	SDADDR[11]	O	3.3V	DSP SDRAM(IC603) ADDRE 11
V20	SDADDR[12]	O	3.3V	DSP SDRAM(IC603) ADDRE 12
U20	SDCASn	O	3.3V	DSP SDRAM(IC603) CONTR SIGNAL
V19	SDRASn	O	3.3V	DSP SDRAM(IC603) CONTR SIGNAL
V18	SDWRn	O	3.3V	DSP SDRAM(IC603) CONTR SIGNAL
V17	SDCSn	O	3.3V	DSP SDRAM(IC603) CONTR SIGNAL
M19	SDCLK100MHz	O	3.3V	DSP SDRAM(IC603) CONTR SIGNAL
G20	XIN	I	3.3V	RTC(32.768KHz)
H20	XOUT	O	3.3V	RTC(32.768KHz)
Y15	PLLREF_XIN	I	3.3V	SYSTEM CLOCK(28.224MH
W15	PLLREF_XOUT	O	3.3V	SYSTEM CLOCK(28.224MH
U15	PLLVDD	PWR	3.3V	PLL POWER
U16	PLLVSS	PWR	GND	PLL GND
U14	PRTIRQn	I	3.3V	G/A INTERRUPT SIGNAL
K20	AUXCLK	O	3.3V	G/A CLOCK(10MHz)
K19	DMAACK2	O	3.3V	PRINT DMA ACKNOWLEDC
F4	DMAREQ2	I	3.3V	PRINT DMA REQUEST
C16	ALE	O	3.3V	ADDRESS LATCH SIGNAL
U3	CS[2]n	O	3.3V	G/A CHIP SELECT
T2	GPIO[9]	O	3.3V	OUTPUT PORT(XRESET)
D9	FCS0n	O	3.3V	NOT USED
A8	FCS1n	O	3.3V	NOT USED
B5	MPIOD[0]	I	3.3V	NOT USED
C5	MPIOD[1]	I	3.3V	NOT USED
A4	MPIOD[2]	I	3.3V	NOT USED
B4	MPIOD[3]	I	3.3V	NOT USED
C4	MPIOD[4]	I	3.3V	NOT USED
D4	MPIOD[5]	I	3.3V	NOT USED

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
A3	MPIOD[6]	I	3.3V	NOT USED
B3	MPIOD[7]	I	3.3V	NOT USED
A5	MFAULTn	I	3.3V	NOT USED
A6	MBUSY	I	3.3V	NOT USED
B6	MACKn	I	3.3V	NOT USED
C6	MSLCTOUT	I	3.3V	NOT USED
D6	MPE	I	3.3V	NOT USED
A7	MSTROBEn	O	3.3V	NOT USED
B7	MAUTOFDn	O	3.3V	NOT USED
C7	MSLCTINn	O	3.3V	NOT USED
D7	MINITn	O	3.3V	NOT USED
D8	MPIODIR	O	3.3V	NOT USED
V8	SC_START[0]	O	3.3V	CIS START SIGNAL
U9	SC_CLK1	O	3.3V	CIS CLOCK
U7	SC_LEDCTRL[0]	O	3.3V	NOT USED
Y8	SC_LEDCTRL[1]	O	3.3V	CIS LED CONTROL
W8	SC_LEDCTRL[2]	O	3.3V	NOT USED
W5	SCIN	AI	3.3V	CIS ANALOG INPUT
U2	GPIO[5]	I	3.3V	INPUT PORT(CISSEL)
U1	GPIO[6]	O	3.3V	OUTPUT PORT(CISON)
P4	GPIO[15]	O	3.3V	OUTPUT PORT(SMPWR2)
R3	SMPWRCTRL	O	3.3V	SCAN MOTOR CURRENT CONTROL(SMPWR1)
U6	SM[0]	O	3.3V	SCAN MOTOR STEP SIGN
Y7	SM[1]	O	3.3V	SCAN MOTOR STEP SIGN
W7	SM[2]	O	3.3V	SCAN MOTOR STEP SIGN
V7	SM[3]	O	3.3V	SCAN MOTOR STEP SIGN
R2	PMPWRCTRL	O	3.3V	ENGINE MOTOR CURRENT CONTROL
N1	GPIO[22]	O	3.3V	OUTPUT PORT(PMPWR2)
U8	PM[0]	O	3.3V	ENGINE MOTOR STEP SIG
W9	PM[1]	O	3.3V	ENGINE MOTOR STEP SIG
Y9	PM[2]	O	3.3V	ENGINE MOTOR STEP SIG
Y12	PM[3]	O	3.3V	ENGINE MOTOR STEP SIG
C1	PIODIR	O	3.3V	PIOD[7:0] DIRECTION
G4	PIOD[0]	I/O	3.3V	PC I/F DATA
H1	PIOD[1]	I/O	3.3V	PC I/F DATA
H2	PIOD[2]	I/O	3.3V	PC I/F DATA
H3	PIOD[3]	I/O	3.3V	PC I/F DATA
H4	PIOD[4]	I/O	3.3V	PC I/F DATA
C2	PIOD[5]	I/O	3.3V	PC I/F DATA
D1	PIOD[6]	I/O	3.3V	PC I/F DATA
D2	PIOD[7]	I/O	3.3V	PC I/F DATA
A2	STROBEn	I	3.3V	PC I/F CONTROL SIGNAL

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
G3	AUTOFDn	I	3.3V	PC I/F CONTROL SIGNAL
G2	SLCTINn	I	3.3V	PC I/F CONTROL SIGNAL
G1	INITn	I	3.3V	PC I/F CONTROL SIGNAL
A1	BUSY	O	3.3V	PC I/F CONTROL SIGNAL
D3	ACKn	O	3.3V	PC I/F CONTROL SIGNAL
C3	SLCTOUT	O	3.3V	PC I/F CONTROL SIGNAL
B2	PE	O	3.3V	PC I/F CONTROL SIGNAL
B1	FAULTn	O	3.3V	PC I/F CONTROL SIGNAL
B8	USB_Dp	I/O	3.3V	USB DATA
C8	USB_Dn	I/O	3.3V	USB DATA
J17	WAITn	O	3.3V	USB POWER DETECT
N17	SEQ	O	3.3V	USB D+ PULLUP CONTROL
J19	SSTXD1	O	3.3V	NOT USED
H17	SSRXD1	I	3.3V	NOT USED
J20	SSCLK1	O	3.3V	NOT USED
J4	GPIO[0]	O	3.3V	OUTPUT PORT(M_SLEEP)
M3	GPIO[1]	O	3.3V	OUTPUT PORT(DPISEL)
V1	GPIO[2]	I	3.3V	INPUT PORT(DRUM)
U4	GPIO[3]	I	3.3V	INPUT PORT(TOPCVR)
T4	CS[5]n	O	3.3V	NOT USED
T3	GPIO[8]	O	3.3V	OUTPUT PORT(OPERST)
T1	RING_DETECT	I	3.3V	BELL DETECT
R4	PWN[0]	O	3.3V	CHARGE BIAS CONTROL
R1	GPIO[14]	O	3.3V	CODEC RESET
P3	M_TXSIN	O	3.3V	CODEC(IC609) CONTROL
P2	M_CLKIN	O	3.3V	CODEC(IC609) CONTROL
P1	M_RXOUT	I	3.3V	CODEC(IC609) CONTROL
N4	M_SCK	I	3.3V	CODEC(IC609) CONTROL
N3	M_STROBE	I	3.3V	CODEC(IC609) CONTROL
N2	M_CNTRL_SIN	O	3.3V	CODEC(IC609) CONTROL
V9	TONE	AO	3.3V	TONE OUTPUT
E1	SDAA_PWRCLK	O	3.3V	NOT USED
E2	SDAA_PWRCLKn	O	3.3V	NOT USED
E4	SDAA_DIBp	I	3.3V	NOT USED
E3	SDAA_DIBn	I	3.3V	NOT USED
V12	SDAA_SPKR	O	3.3V	NOT USED
Y3	ADCREFp	I	3.3V	POSITIVE REFERENCE
Y2	ADCREFn	I	3.3V	NEGATIVE REFERENCE
Y5	ADGA	PWR	GND	A/D ANALOG GND
V5	ADVA	PWR	3.3V	A/D ANALOG POWER
U5	ADGD	PWR	GND	A/D DIGITAL GND
Y4	ADCVC	PWR	3.3V	A/D INTERNAL GND
Y6	SENIN[0]	AI	3.3V	A/D ANALOG INPUT
W6	SENIN[1]	AI	3.3V	NOT USED

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
V6	SENIN[2]	AI	3.3V	NOT USED
W12	EV_VD[0]	I	3.3V	NOT USED
U12	EV_VD[1]	I	3.3V	NOT USED
Y13	EV_VD[2]	I	3.3V	NOT USED
W13	EV_VD[3]	I	3.3V	NOT USED
U13	EV_VD[4]	I	3.3V	NOT USED
Y14	EV_VD[5]	I	3.3V	NOT USED
W14	EV_VD[6]	I	3.3V	NOT USED
V14	EV_VD[7]	I	3.3V	NOT USED
V13	EV_CLK	I	3.3V	NOT USED
N19	W_Rn	O	3.3V	NOT USED
N18	XAKn	O	3.3V	NOT USED
M18	DMACYC/CLK_CONFIG[2]	O	3.3V	DSP SDRAM(IC603) CLOCK
J18	CACHEHIT/ JTAG_MODE_SEL	O	3.3V	NOT USED
W3	TCK	I	3.3V	JTAG TEST PIN
W2	TMS	I	3.3V	JTAG TEST PIN
W1	TRSTn	I	3.3V	JTAG TEST PIN
V4	TDI	I	3.3V	JTAG TEST PIN
V3	TDO	O	3.3V	JTAG TEST PIN
V2	TEST	I	3.3V	NOT USED
J1	SCANMOD	I	3.3V	NOT USED
J2	TESTER_MODE	I	3.3V	NOT USED
J3	P80_SEL	I	3.3V	NOT USED
F3	SSD_DIBRX	O	3.3V	NOT USED
F2	TX_DATA	O	3.3V	NOT USED
F1	SDAA_GPIO_INT	O	3.3V	NOT USED
Y1	POWER1	I	3.3V	5V POWER DOWN DETECT
W4	POWER2	I	3.3V	3.3V POWER DOWN DETEC
K18	RESETn	O	3.3V	RESET OUTPUT
H18	PWRDWNn	I	3.3V	POWER DOWN
H19	WPROTn	O	3.3V	NOT USED
G17	BATRSTn	I	3.3V	RTC RESET
G19	EXT_PWRDWN_SELn	I	3.3V	POWER DOWN SELECT
M2	P80VDD	PWR	3.3V	P80DSP DIGITAL POWER SOURCE(+3.3V)
M1	P80VSS	PWR	5V	P80DSP DIGITAL POWER SOURCE(GND)
M17	VGG1	PWR	5V	POWER SOURCE(+5V)
D14	VGG2	PWR	5V	POWER SOURCE(+5V)
D5	VGG3	PWR	5V	POWER SOURCE(+5V)
M4	VGG4	PWR	5V	POWER SOURCE(+5V)
E18	VDRAM	PWR	3.3V	DRAM BACKUP POWER SO 3.3V/BATT)

No.	NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
F17	VRTC	PWR	3.3V	RTC BACKUP POWERSOU 3.3V/BATT)
A10	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
B10	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
C10	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
K1	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
K2	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
K3	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
K4	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
U11	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
V11	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
W11	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
Y11	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
K17	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
M20	VDD	PWR	3.3V	DIGITAL POWER SOURCE(
L1	VSS	PWR	GND	DIGITAL POWER SOURCE(
L2	VSS	PWR	GND	DIGITAL POWER SOURCE(
L3	VSS	PWR	GND	DIGITAL POWER SOURCE(
L4	VSS	PWR	GND	DIGITAL POWER SOURCE(
U10	VSS	PWR	GND	DIGITAL POWER SOURCE(
V10	VSS	PWR	GND	DIGITAL POWER SOURCE(
W10	VSS	PWR	GND	DIGITAL POWER SOURCE(
Y10	VSS	PWR	GND	DIGITAL POWER SOURCE(
L17	VSS	PWR	GND	DIGITAL POWER SOURCE(
L18	VSS	PWR	GND	DIGITAL POWER SOURCE(
L19	VSS	PWR	GND	DIGITAL POWER SOURCE(
L20	VSS	PWR	GND	DIGITAL POWER SOURCE(
A11	VSS	PWR	GND	DIGITAL POWER SOURCE(
B11	VSS	PWR	GND	DIGITAL POWER SOURCE(
C11	VSS	PWR	GND	DIGITAL POWER SOURCE(
D11	VSS	PWR	GND	DIGITAL POWER SOURCE(

7.3.2.2.2. (IC610)

No.	PIN NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATIO
1	TEST2	I	3.3V	NOT USED
2	MVDD		3.3V	POWER SOURCE(PLL +3
3	XPD	I	5V	RESET INPUT FOR PLL
4	VSS		GND	POWER SOURCE(GND)
5	AVDD		3.3V	POWER SOURCE(PLL +3
6	CHGO	O		PLL LOW PASS FILTER
7	LPVSS		GND	POWER SOURCE(GND)
8	VSS		GND	POWER SOURCE(GND)
9	VSS		GND	POWER SOURCE(GND)
10	3.3V		3.3V	POWER SOURCE(+3.3V)
11	CLKIN	I	3.3V	CLOCK FOR PLL
12	IRQ	O	3.3V	INTERRUPT TO ASIC
13	DMAREQ	O	3.3V	DMA REQUEST TO ASIC
14	DMAACK	I	3.3V	DMA ACKNOWLEDGE F
15	XRESET	I	3.3V	RESET INPUT
16	XCS	I	3.3V	CHIP SELECT FROM ASI
17	XRD	I	3.3V	READ SIGNAL FROM AS
18	XWR	I	3.3V	WRITE SIGNAL FROM A
19	ALE	I	3.3V	ADDRESS LATCH SIGNA ASIC
20	VSS		GND	POWER SOURCE(GND)
21	DB0	I/O	3.3V	DATA BUS 0
22	DB1	I/O	3.3V	DATA BUS 1
23	DB2	I/O	3.3V	DATA BUS 2
24	DB3	I/O	3.3V	DATA BUS 3
25	VSS		GND	POWER SOURCE(GND)
26	3.3V		3.3V	POWER SOURCE(+3.3V)
27	DB4	I/O	3.3V	DATA BUS 4
28	DB5	I/O	3.3V	DATA BUS 5
29	DB6	I/O	3.3V	DATA BUS 6
30	DB7	I/O	3.3V	DATA BUS 7
31	VSS		GND	POWER SOURCE(GND)
32	DB8	I/O	3.3V	DATA BUS 8
33	DB9	I/O	3.3V	DATA BUS 9
34	DB10	I/O	3.3V	DATA BUS 10
35	DB11	I/O	3.3V	DATA BUS 11
36	VSS		GND	POWER SOURCE(GND)
37	3.3V		3.3V	POWER SOURCE(+3.3V)
38	DB12	I/O	3.3V	DATA BUS 12
39	DB13	I/O	3.3V	DATA BUS 13
40	DB14	I/O	3.3V	DATA BUS 14
41	DB15	I/O	3.3V	DATA BUS 15
42	VSS		GND	POWER SOURCE(GND)
43	SDCLK	I	3.3V	SDRAM CLOCK

No.	PIN NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
44	VSS		GND	POWER SOURCE(GND)
45	3.3V		3.3V	POWER SOURCE(+3.3V)
46	A0	I	3.3V	ADDRESS BUS 0
47	A1	I	3.3V	ADDRESS BUS 1
48	A2	I	3.3V	ADDRESS BUS 2
49	A3	I	3.3V	ADDRESS BUS 3
50	A4	I	3.3V	ADDRESS BUS 4
51	A5	I	3.3V	ADDRESS BUS 5
52	A6	I	3.3V	ADDRESS BUS 6
53	A7	I	3.3V	ADDRESS BUS 7
54	A8	I	3.3V	ADDRESS BUS 8
55	A9	I	3.3V	ADDRESS BUS 9
56	A10	I	3.3V	ADDRESS BUS 10
57	A11	I	3.3V	ADDRESS BUS 11
58	VSS		GND	POWER SOURCE(GND)
59	3.3V		3.3V	POWER SOURCE(+3.3V)
60	A12	O	3.3V	ADDRESS BUS 12
61	A13	O	3.3V	ADDRESS BUS 13
62	A14	O	3.3V	ADDRESS BUS 14
63	A15	O	3.3V	ADDRESS BUS 15
64	A16	O	3.3V	ADDRESS BUS 16
65	A17	O	3.3V	ADDRESS BUS 17
66	A18	O	3.3V	ADDRESS BUS 18
67	A19	O	3.3V	ADDRESS BUS 19
68	A20	O	3.3V	ADDRESS BUS 20
69	A21	O	3.3V	ADDRESS BUS 21
70	VSS		GND	POWER SOURCE(GND)
71	3.3V		3.3V	POWER SOURCE(+3.3V)
72	IOP60/A22	I/O	3.3V	NOT USED
73	IOP61/A23	I/O	3.3V	NOT USED
74	IOP00	I/O	5V	OUTPUT PORT(SENCTL0
75	IOP01	I/O	5V	OUTPUT PORT(SENCTL1
76	IOP02	I/O	5V	OUTPUT PORT(SENCTL2
77	IOP03	I/O	5V	OUTPUT PORT(SENCTL3
78	IOP04	I/O	5V	OUTPUT PORT(SENCTL4
79	IOP05	I/O	5V	OUTPUT PORT(PICKUP)
80	IOP06	I/O	5V	OUTPUT PORT(HTRCTL)
81	IOP07	I/O	5V	INPUT PORT(PDET)
82	VSS		GND	POWER SOURCE(GND)
83	5V		5V	POWER SOURCE(+5V)
84	APC	O	5V	LSU CONTROL(APC)
85	LASERON	O	5V	LSU CONTROL(LDON)
86	VSS		GND	POWER SOURCE(GND)
87	VIDEO	O	5V	LSU CONTROL(VIDEO)

No.	PIN NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
88	5V		5V	POWER SOURCE(+5V)
89	XHSYNC	I	5V	LSU CONTROL(XHSYNC)
90	XREADY	I	5V	LSU CONTROL(XREADY)
91	POLON	O	5V	LSU CONTROL(POLON)
92	POLCLK	O	5V	LSU CONTROL(POLCLK)
93	IOP10/RVN1	I/O	5V	FAN1 CONTROL(FANDET
94	IOP11/RVN2	I/O	5V	FAN2 CONTROL(FANDET
95	IOP12/FANON1	I/O	5V	FAN1 CONTROL(FANON
96	IOP13/FANON2	I/O	5V	FAN2 CONTROL(FANON
97	3.3V		3.3V	POWER SOURCE(+3.3V)
98	VSS		GND	POWER SOURCE(GND)
99	5V		5V	POWER SOURCE(+5V)
100	IOP14	I/O	5V	INPUT PORT(CISPOS1)
101	IOP15	I/O	5V	INPUT PORT(CISPOS2)
102	IOP16	I/O	5V	INPUT PORT(JOG1)
103	IOP17	I/O	5V	INPUT PORT(JOG2)
104	KSTART	O	5V	OPERATION PANAL CON
105	KLATCH	O	5V	OPERATION PANAL CON
106	KSCLK	O	5V	OPERATION PANAL CON
107	KTXD	O	5V	OPERATION PANAL CON
108	KRXD	I	5V	OPERATION PANAL CON
109	VSS		GND	POWER SOURCE(GND)
110	5V		5V	POWER SOURCE(+5V)
111	IOP20/MA	I/O	5V	NOT USED
112	IOP21/MXA	I/O	5V	NOT USED
113	IOP22/MB	I/O	5V	NOT USED
114	IOP23/MXB	I/O	5V	NOT USED
115	IOP24/MPWDN	I/O	5V	NOT USED
116	IOP25	I/O	5V	NOT USED
117	IOP26	I/O	5V	NOT USED
118	IOP27	I/O	5V	NOT USED
119	IOP30	I/O	5V	NOT USED
120	IOP31	I/O	5V	INPUT PORT(POUT)
121	IOP32	I/O	5V	INPUT PORT(PAPER)
122	VSS		GND	POWER SOURCE(GND)
123	5V		5V	POWER SOURCE(+5V)
124	IOP33/CBUSY2	I/O	5V	NOT USED
125	IOP34/CSO	I/O	5V	NOT USED
126	IOP35/CBUSY1	I/O	5V	NOT USED
127	IOP36/CCLK	I/O	5V	NOT USED
128	IOP37/CSI	I/O	5V	INPUT PORT(TNREMP)
129	MILAT	O	5V	ANALOG GATE ARRAY
130	MIDAT	O	5V	ANALOG GATE ARRAY
131	MICLK	O	5V	ANALOG GATE ARRAY

No.	PIN NAME	I/O	POWER SUPPLIED VOLTAGE	EXPLANATION
132	3.3V		3.3V	POWER SOURCE(+3.3V)
133	VSS		GND	POWER SOURCE(GND)
134	5V		5V	POWER SOURCE(+5V)
135	ECLK	O	5V	ELECTRICAL VOLUME IC CONTROL
136	ESTB	O	5V	ELECTRICAL VOLUME IC CONTROL
137	EDATA	O	5V	ELECTRICAL VOLUME IC CONTROL
138	IOP40	I/O	5V	INPUT PORT(HOOK)
139	IOP41	I/O	5V	INPUT PORT(VOX)
140	IOP42	I/O	5V	OUTPUT PORT(ALC)
141	IOP43	I/O	5V	OUTPUT PORT(P-SHORT
142	IOP44	I/O	5V	OUTPUT PORT(CID)
143	IOP45	I/O	5V	INPUT PORT(EX-HOOK)
144	IOP46	I/O	5V	OUTPUT PORT(AGC)
145	IOP47	I/O	5V	OUTPUT PORT(BREAK)
146	VSS		GND	POWER SOURCE(GND)
147	5V		5V	POWER SOURCE(+5V)
148	IOP50	I/O	5V	OUTPUT PORT(SPMUTE)
149	IOP51	I/O	5V	OUTPUT PORT(RLY)
150	IOP52	I/O	5V	NOT USED
151	IOP53	I/O	5V	NOT USED
152	IOP54	I/O	5V	NOT USED
153	IOP55	I/O	5V	OUTPUT PORT(SENCTL5
154	IOP56	I/O	5V	INPUT PORT(REGIST)
155	IOP57	I/O	5V	OUTPUT PORT(DEV)
156	TRS	O	5V	TRANSCRIPTION CLOCK
157	VSS		GND	POWER SOURCE(GND)
158	5V		5V	POWER SOURCE(+5V)
159	TEST0	I	3.3V	NOT USED
160	TEST1	I	3.3V	NOT USED

7.3.3. SRAM AND RTC BACKUP CIRCUIT

1. Function

This unit has a lithium battery (BAT600) which works for the Real Time Clock IC (RTC: inside IC604).

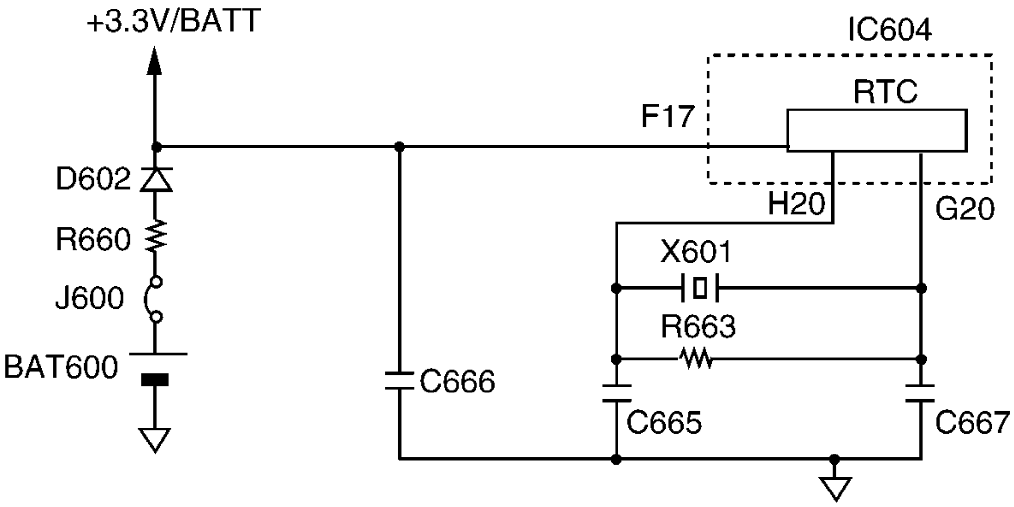
The RTC continues to work, backed up by a lithium battery even when the power switch is OFF.

2. RTC Inside (IC604) Backup Circuit Operation

When the power switch is turned ON, power is supplied to the

RTC (inside IC604). At this time, the voltage at pin F17 of the IC604 is +3.3V. When the power switch is turned OFF, the BAT600 supplies power to RTC through D602. The voltage at pin F17 of IC604 is about +2.5V. When the power switch is OFF and the voltage of +3.3V decreases, pin F17 of RTC (IC604) becomes roughly the same voltage as the battery voltage. RTC goes into the backup mode, in which the power consumption is lower.

Circuit Diagram

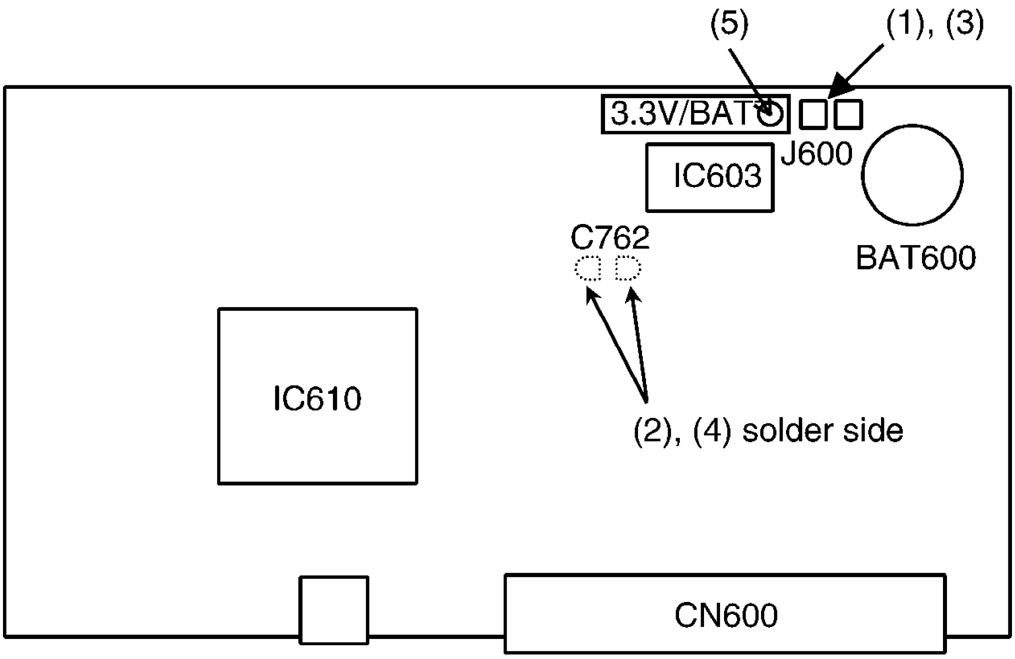


Points to notice when replacing the battery

When the backup battery becomes low or the backup function is turned off for repairing, recover the backup power supply following the procedure described below.

(1) Replace the battery and IC. J600 should be removed beforehand.
(2) Short the both ends of C762. (Ex. Pinch them with tweezers.)
(3) Connect terminals of J600 with solder.
(4) Short the both ends of C762 again. (Ex. Pinch them with tweezers.)
(5) Make sure that the voltage of 3.3V/BATT test land is more than 2.7 V.

Digital Unit component view



7.3.4. MODEM SECTION

7.3.4.1. FUNCTION

The unit uses CODEC (IC609) and ASIC (IC604) that serves as an interface between the control section for FAX transmission and reception and the telephone line. During a transmitting operation, the digital image signals are modulated and sent to the telephone line.
During a receiving operation, the analog image signals which are received via the telephone line are demodulated and converted into digital image signals. The communication format and procedures for FAX communication are standardized by ITU-T. CODEC and ASIC has hardware which sends and detects all of the necessary signals for FAX communication.
It can be controlled by writing commands from the CPU (IC604: inside ASIC).
This CODEC and ASIC also sends DTMF signals, generates a call tone (from the speaker), and detects a busy tone and dial tones.
Overview of Facsimile Communication Procedures (ITU-T Recommendation):

1. **ON CCITT (International Telegraph and Telephone Consultative Committee)**
   The No. XIV Group of ITU-T, one of the four permanent organizations of the International Telecommunications Union (ITU), investigates and make recommendations on international standards for facsimiles.
2. **Definition of Each Group**

   - **Group I (G1)**
     Official A-4 size documents without using formats which reduce the band width of a signal are sent over telephone

lines. Determined in 1968.

Transmission for about 6 minutes at a scanning line density of 3.85 lines/mm.

- Group II (G2)

Using reduction technology in the modulation/demodulation format, an A-4 size document is sent at an official scanning line density of 3.85 lines/mm for about 3 minutes.

Methods to suppress redundancy are not used.

Determined in 1976.

- Group III (G3)

Method of suppressing redundancy in the image signal prior to modulation is used. An A-4 size document is sent within about one minute.

Determined in 1980.

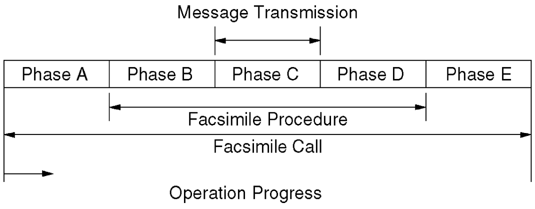
- Group IV (G4)

Transmission is via the data network. A method is provided for suppressing redundancy in signals prior to transmission, and error-free reception of transmission is possible.

The scope of these facsimile applications is not limited simply to transmission of written statements. Through symbiotic linkages with other communication methods, it can be expected to expand to include integrated services.

3. Facsimile Call Time Series

As shown in the following diagram, the facsimile call time series is divided into five phases.



Phase A : Call setting

Call setting can be manual/automatic.

Phase B : Pre-message procedure

Phase B is a pre-processing procedure and sequence for confirming the status of the terminal, transmission route, etc., and for terminal control. It implements terminal preparation status, determines and displays terminal constants, confirms

synchronization status, etc. and prepares for transmission of facsimile messages.

Phase C : Message transmission

Phase C is the procedure for the transmitting facsimile messages.

Phase D : Post message procedure

Phase D is the procedure for confirming that the message is completed and received. For continuous transmission, phase B or phase C is repeated for transmission.

Phase E : Call retrieval

Phase E is the procedure for call retrieval, that is for circuit disconnection.

4. Concerning Transmission Time

[Transmission Time] = [Control Time] + [Image Transmission Time] + [Hold Time]

Transmission time consists of the following.

Control time:
This is time at the start of transmission when the functions at the sending and receiving sides are confirmed, the transmission mode is established, and transmission and reception are synchronized.

Image transmission time:
This is the time required for the transmission of document contents (image data). In general, this time is recorded in the catalog, etc.

Hold time:
This is the time required after the document contents have been sent to confirm that the document was actually sent, and to check for telephone reservations and/or the existence of continuous transmission.

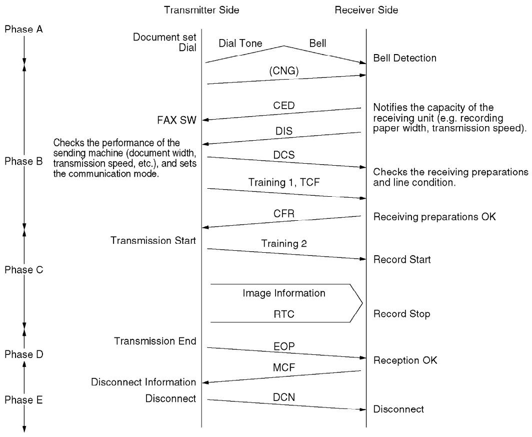
5. Facsimile Standards

Item	Telephone Network Facsimile
	G3 Machine
Connection Control Mode	Telephone Network Signal Mode
Terminal Control Mode	T. 30 Binary
Facsimile Signal Format	Digital
Modulation Mode	PSK (V. 27 ter) or QAM (V. 29)
Transmission Speed	300 bps (Control Signal) 2400, 4800, 7200, 9600, 12000, 14400 bps (FAX Signal)
Redundancy Compression Process (Coding Mode)	1 dimension : MH Mode 2 dimension : MR Mode (K=2.4)
Resolution	Main Scan : 8 pel/mm Sub Scan : 3.85, 7.7l/mm
Line Synchronization Signal	EOL Signal
1 Line Transmission Time [ms/line]	Depends on the degree of data reduction. Minimum Value : 10, 20 Can be recognized in 40ms.

6. Explanation of Communication and Compression Technology

A. G3 Communication Signals (T. 30 Binary Process)

For G3 Facsimile communication, this is the procedure for exchanging control signals between the sending and receiving machines both before and after transmission of image signals. Control signals at 300 bps FSK are: 1850 Hz...0, 1650Hz...1. An example of a binary process in G3 communication is shown below.


Transmitter Side
Receiver Side
Phase A
Document set
Dial
Dial Tone
Bell
Bell Detection
(CNG)
CED
FAX SW
Notifies the capacity of the receiving unit (e.g. recording paper width, transmission speed).
DIS
Checks the performance of the sending machine (document width, transmission speed, etc.), and sets the communication mode.
Phase B
DCS
Checks the receiving preparations and line condition.
Training 1, TCF
CFR
Receiving preparations OK
Transmission Start
Training 2
Record Start
Phase C
Image Information
RTC
Record Stop
Transmission End
EOP
Phase D
Reception OK
MCF
Disconnect Information
Phase E
Disconnect
DCN
Disconnect

Explanation of Signals

Control signals are comprised mainly of 8-bit identification signals and the data signals added to them. Data signals are added to DIS and DCS signals.

Signal.....DIS (Digital Identification Signal)

Identification Signal Format.....00000001

Function:

Notifies the capacity of the receiving unit. The added data signals are as follows.

Signal.....DCS (Digital Command Signal) / Identification Signal Format.....X1000001

Example

(Some models do not support the following items.):

Bit No.	DIS/DTC	DCS
1	Transmitter --- T.2 operation	
2	Receiver --- T.2 operation	Receiver --- T.2 operation
3	T.2 IOC = 176	T.2 IOC = 176
4	Transmitter --- T.3 operation	
5	Receiver --- T.3 operation	Receiver --- T.3 operation
6	Reserved for future T.3 operation features	
7	Reserved for future T.3 operation features.	
8	Reserved for future T.3 operation features.	
9	Transmitter --- T.4 operation	
10	Receiver --- T.4 operation	Receiver --- T.4 operation
11, 12, 13, 14	Data signaling rate	Data signaling rate
0, 0, 0, 0	V.27 ter fall back mode	2400 bit/s, V.27 ter
0, 1, 0, 0	V.27 ter	4800 bit/s, V.27 ter
1, 0, 0, 0	V.29	9600 bit/s, V.29
1, 1, 0, 0	V.27 ter and V.29	7200 bit/s, V.29
0, 0, 1, 0	Not used	14400 bit/s, V.33
0, 1, 1, 0	Reserved	12000 bit/s, V.33
1, 0, 1, 0	Not used	Reserved
1, 1, 1, 0	V.27 ter and V.29 and V.33	Reserved
0, 0, 0, 1	Not used	14400 bit/s, V.17
0, 1, 0, 1	Reserved	12000 bit/s, V.17
1, 0, 0, 1	Not used	9600 bit/s, V.17
1, 1, 0, 1	V.27 ter and V.29 and V.33 and V.17	7200 bit/s, V.17
0, 0, 1, 1	Not used	Reserved
0, 1, 1, 1	Reserved	Reserved
1, 0, 1, 1	Not used	Reserved
1, 1, 1, 1	Reserved	Reserved
15	R8×7.7 lines/mm and/or 200×200 pels/ 25.4mm	R8×7.7 lines/mm and/or 200×200 p 25.4mm
16	Two-dimensional coding capability	Two-dimensional coding capabilit

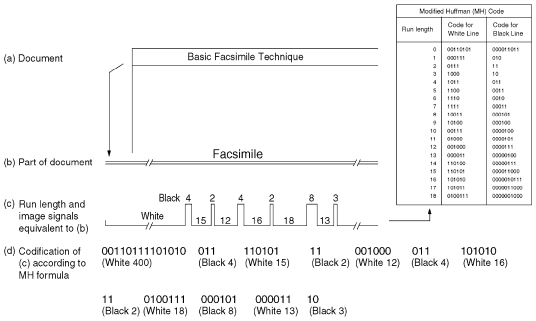
Bit No.	DIS/DTC	DCS
17, 18 (0, 0) (0, 1) (1, 0) (1, 1)	Recording width capabilities 1728 picture elements along scan line length of 215 mm ± 1% 1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% 2432 picture elements along scan line length of 303 mm ± 1% 1728 picture elements along scan line length of 215 mm ± 1% 2048 picture elements along scan line length of 255 mm ± 1% Invalid	Recording width 1728 picture elements along scan length of 215 mm ± 1% 2432 picture elements along scan length of 303 mm ± 1% 2048 picture elements along scan length of 255 mm ± 1% Invalid
19, 20	Maximum recording length capability	Maximum recording length
(0, 0)	A4 (297 mm)	A4 (297 mm)
(0, 1)	Unlimited	Unlimited
(1, 0)	A4 (297 mm) and B4 (364 mm)	B4 (364 mm)
(1, 1)	Invalid	Invalid
21, 22, 23 (0, 0, 0) (0, 0, 1) (0, 1, 0) (1, 0, 0) (0, 1, 1) (1, 1, 0) (1, 0, 1) (1, 1, 1)	Minimum scan line time capability of the receiver 20 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 40 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 5 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$ 10 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 20 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 40 ms at 3.85 l/mm: $T_{7.7} = 1/2\ T_{3.85}$ 0 ms at 3.85 l/mm: $T_{7.7} = T_{3.85}$	Minimum scan line time 20 ms 40 ms 10 ms 5 ms 0 ms
24	Extend field	Extend field
25	2400 bit/s handshaking	2400 bit/s handshaking
26	Uncompressed mode	Uncompressed mode
27	Error correction mode	Error correction mode
28	Set to "0".	Frame size 0 = 256 octets 1 = 64 o
29	Error limiting mode	Error limiting mode
30	Reserved for G4 capability on PSTN	Reserved for G4 capability on PST
31	T.6 coding capability	T.6 coding enabled
32	Extend field	Extend field

Bit No.	DIS/DTC	DCS
33 (0) (1)	Validity of bits 17, 18 Bits 17, 18 are valid Bits 17, 18 are invalid	Recording width Recording width indicated by bits Recording width indicated by this information
34	Recording width capability 1216 picture elements along scan line length of 151 ± mm 1%	Middle 1216 elements of 1728 pict elements
35	Recording width capability 864 picture elements along scan line length of 107 ± mm 1%	Middle 864 elements of 1728 pictu elements
36	Recording width capability 1728 picture elements along scan line length of 151 ± mm 1%	Invalid
37	Recording width capability 1728 picture elements along scan line length of 107 ± mm 1%	Invalid
38	Reserved for future recording width capability.	
39	Reserved for future recording width capability.	
40	Extend field	Extend field
41	R8×15.4 lines/mm	R8×15.4 lines/mm
42	300×300 pels/25.4 mm	300×300 pels/25.4 mm
43	R16×15.4 lines/mm and/or 400×400 pels/ 25.4 mm	R16×15.4 lines/mm and/or 400×40 25.4 mm
44	Inch based resolution preferred	Resolution type selection "0" : neuritic based resolution "1" : inch based resolution
45	Metric based resolution preferred	Don’t care
46	Minimum scan line time capability for higher resolutions "0" : $T_{15.4} = T_{7.7}$ "1" : $T_{15.4} = 1/2T_{7.7}$	Don’t care
47	Selective Polling capability	Set to "0".
48	Extend field	Extend field

Note 1 - Standard facsimile units conforming to T.2 must have the following capability : Index of cooperation (IOC)=264.
Note 2 - Standard facsimile units conforming to T.3 must have the following capability : Index of cooperation (IOC)=264.
Note 3 - Standard facsimile units conforming to T.4 must have the following capability : Paper length=297 mm.

Signal	Identification Signal Format	Function
Training 1	—	**A fixed pattern is transmitted to the receivin at a speed (2400 to 14400 bps) designated b DCS, and the receiving side optimizes the automatic equalizer, etc., according to this si**
TCF (Training Check)	—	**Sends 0 continuously for 1.5 seconds at the speed as the training signal.**
CFR (Confirmation to Receive)	**X0100001**	**Notifies the sending side that TCF has been properly received. If TCF is not properly rece FTT (Failure To Train) X0100010 is relayed to sender. The sender then reduces the transmission speed by one stage and initiate training once again.**
Training 2	—	**Used for reconfirming the receiving side like training 1.**
Image Signal	**Refer to the next page.**	—
RTC (Return to Control)	—	**Sends 12 bits (0...01 × 6 times) to the receive the same speed as the image signal and noti completion of transmission of the first sheet**
EOP (End of Procedure)	**X1110100**	**End of one communication**
MCF (Message Confirmation)	**X0110001**	**End of 1 page reception**
DCN (Disconnect)	**X1011111**	**Phase E starts.**
MPS (Multi-Page Signal)	**X1110010**	**Completion of transmission of 1 page. If ther still more documents to be sent, they are out instead of EOP. After MCF reception, the sen transmits an image signal of the second she**
PRI-EOP (Procedural Interrupt-EOP)	**X1111100**	**If there is an operator call from the sender, it output after RTC.**
PIP (Procedural Interrupt Positive)	**X0110101**	**This is output when an operator call is recei**

B. Redundancy Compression Process Coding Mode / This unit uses one-dimensional MH format.


(a) Document
Basic Facsimile Technique
(b) Part of document
Facsimile
(c) Run length and image signals equivalent to (b)
Black 4 2 4 2 8 3
White 15 12 16 18 13
(d) Codification of (c) according to MH formula
00110111101010 (White 400)
011 (Black 4)
110101 (White 15)
11 (Black 2)
001000 (White 12)
011 (Black 4)
101010 (White 16)
11 (Black 2)
0100111 (White 18)
000101 (Black 8)
000011 (White 13)
10 (Black 3)

Modified Huffman (MH) Code

Run length	Code for White Line	Code for Black Line
0	00110101	000011011
1	000111	010
2	0111	11
3	1000	10
4	1011	011
5	1100	0011
6	1110	0010
7	1111	00011
8	10011	000101
9	10100	000100
10	00111	0000100
11	01000	0000101
12	001000	0000111
13	000011	00000100
14	110100	00000111
15	110101	000011000
16	101010	0000010111
17	101011	0000011000
18	0100111	0000001000

(c) Total bit number before MH codification (497 bit)
(d) Total bit number after MH codification (63 bit)

7.3.4.2. MODEM CIRCUIT OPERATION

The CODEC (IC609) and ASIC (IC604) has all the hardware satisfying the CCITT standards mentioned previously.
ASIC (IC604) controlled codec (IC609 by senial data.
This CODEC (IC609) and ASIC (IC604) has an automatic application equalizer. With training signal 1 or 2 at the time of G3 reception, it can automatically establish the optimum equalizer.

1. **Facsimile Transmission/DTMF Line Send**
   The digital image data on the data bus is modulated in the modem (IC602), and sent from pin 69 via modem IC602, Analog gate array IC201(24 → 22), amplifier IC207(2 → 1) and the NCU section to the telephone line.
   Refer to CHECK SHEET().

2. **Facsimile Reception**
   The analog image data which is received from the telephone line passes through the NCU section and enters pin 14 of the CODEC (IC609). The signals that enter pin 14 of the CODEC (IC609) are demodulated in the board to digital image signals, and then senol pin p1 of the ASIC (IC604).
   In this case, the image signals from the telephone line are transmitted serially. In the ASIC (IC604). Here, the internal equalizer circuit reduces the image signals to a long-distance receiving level.
   This is designed to correct the characteristics of the frequency band centered around 3 kHz and maintain a constant receiving sensitivity.
   It can be set in the service mode.
   Refer to CHECK SHEET().

3. **DTMF Transmission (Monitor tone)**
   The DTMF signal generated in the ASIC (IC604) is output from pin P3, and the NCU section to the telephone line the same as

facsimile transmission signals.
(DTMF Monitor Tone)
Refer to CHECK SHEET().

4. Busy/Dial Tone Detection

The path is the same as FAX receiving. When it is detected, the carrier detect bit of the resistor in the ASIC (IC604) becomes 1, and this status is monitored by itself (IC604).

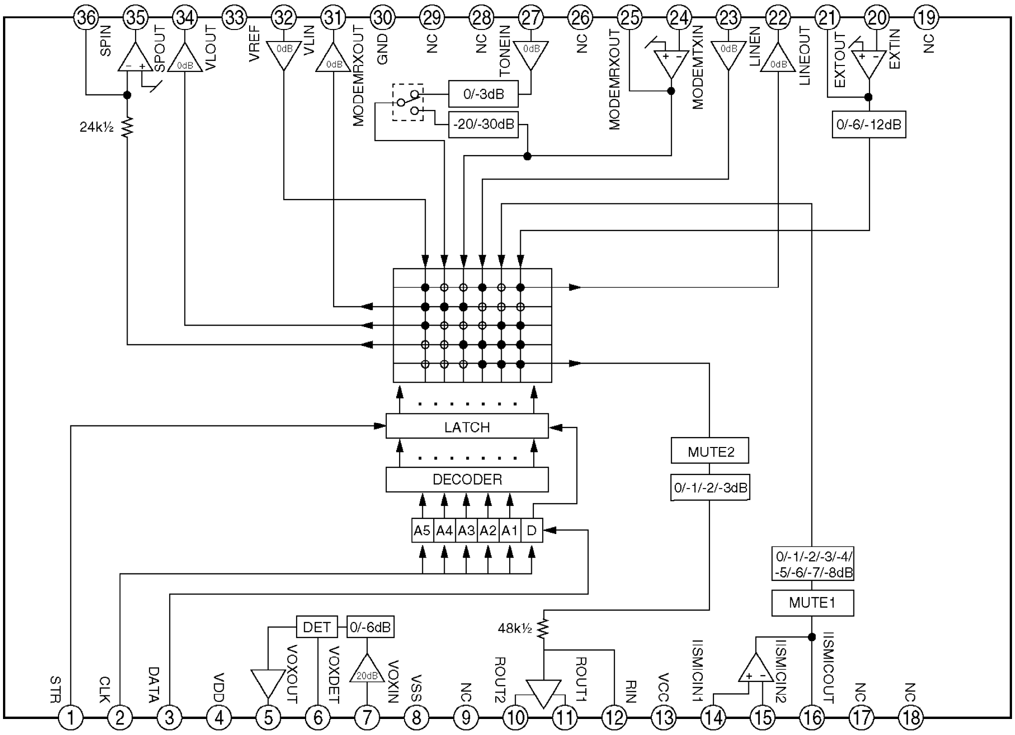
5. Call Tone Transmission

This is the call signal which is generated the ASIC (IC604) and sent to the speaker.

7.3.5. ANALOG SECTION

7.3.5.1. ANALOG GATE ARRAY (IC201 on the Digital Board))

This IC can perform signal route switching and level adjustments for various types of analog signals.
This IC incorporates a cross-point switch (CPS), an electronic volume.
The CPS of this IC is controlled by sending data from digital ASIC.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28
27
26
25
24
23
22
21
20
19
SPIN
SPOUT
VLOUT
VREF
VLIN
MODEMRXOUT
GND
NC
NC
TONEIN
NC
MODEMRXOUT
MODEMTXIN
LINEN
LINEOUT
EXTOUT
EXTIN
NC
0dB
24k½
0/-3dB
-20/-30dB
0/-6/-12dB
LATCH
DECODER
A5
A4
A3
A2
A1
D
MUTE2
0/-1/-2/-3dB
0/-1/-2/-3/-4/-5/-6/-7/-8dB
MUTE1
DET
0/-6dB
20dB
48k½
STR
CLK
DATA
VDD
VOXOUT
VOXDET
VOXIN
VSS
NC
ROUT2
ROUT1
RIN
VCC
IISMICIN1
IISMICIN2
IISMICOUT
NC
NC
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

Explanation of ANALOG GATE ARRAY (IC201 on the DIGITAL Board)

No.	Name	Function	No.	Name	Function
1	STR	Strobe input	19	NC	Not used
2	CLOCK	Clock input	20	EXTIN	Ext amp output
3	DATA	Data input	21	EXTOUT	Ext amp input
4	VDD	Logic power supply	22	LINEOUT	Line amp output
5	VOXOUT	VOX output	23	LINEIN	Line amp input
6	VOXDET	VOX detection adjustment	24	MODEMTXIN	MODEM TX amp input
7	VOXIN	VOX input	25	MODEMTXOUT	MODEM TX amp output
8	VSS	Logic ground	26	NC	Not used
9	NC	Not used	27	TONEIN	Tone amp input
10	ROUT2	HS receiver amp output 2	28	NC	Not used
11	ROUT1	HS receiver amp output 1	29	NC	Not used
12	RIN	HS receiver amp input	30	GND	Analog ground
13	VCC	Analog ground	31	MODEMRXOUT	MODEM RX amp output
14	HSMICIN1	HS mic amp input 1	32	VLIN	Volume amp input
15	HSMICIN2	HS mic amp input 2	33	VREF	Reference voltage output
16	HSMICOUT	HS mic amp output	34	VLOUT	Volume amp output
17	NC	Not used	35	SPOUT	Speaker amp output
18	NC	Not used	36	SPIN	Speaker amp input

7.3.5.2. DESCRIPTION OF BLOCK DIAGRAM IN ANALOG SECTION

1. Function

The analog section works as an interface between the telephone line.

The analog ASIC (IC201) on the digital board exchanges FAX TX and RX signals between the CODEC (IC609) and the analog section.

The control signals transmitted to the analog section are output mainly from G/A IC610, and the analog status is stored as data in G/A IC610.

2. Circuit Operation

[NCU]: Network Control Unit the NCU comprises of the following; DC loop forming circuit to connect with the telephone line; Switching circuit for other interconnected telephones; Bell detection circuit; Extension phone line off-hook detection circuit; Side tone circuit; Remote fax activation circuit.

Refer to NCU SECTION () for the details.

7.3.5.3. BLOCK DIAGRAM

7.3.5.4. NCU SECTION

7.3.5.4.1. GENERAL

This section is the interface between the telephone line and external telephone. It is composed of an EXT. TEL line relay (RY202), bell detection circuit, TAM interface circuit, line amplifier and side tone circuits and a multiplexer.

7.3.5.4.2. EXT. TEL. LINE RELAY (RY202)

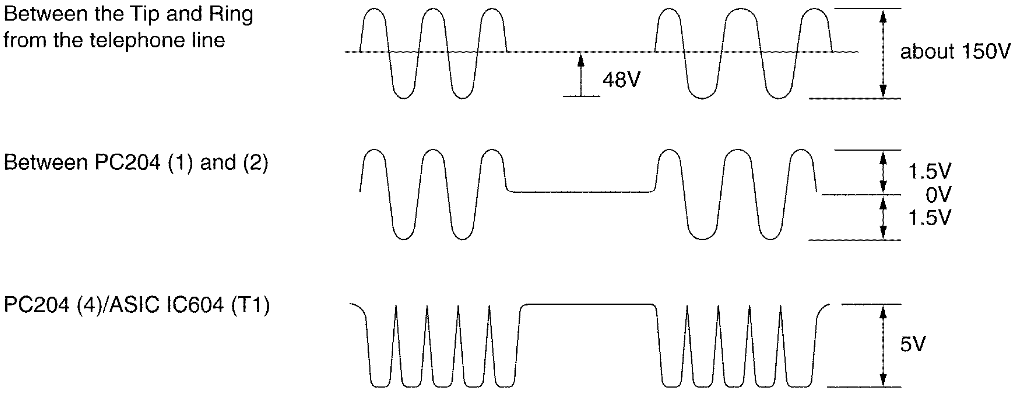
1. Circuit Operation

Normally, this relay switches to the external telephone side (break) and switches to the open side (make) while OFF-HOOK.
{ IC610 (149) High Level → CN616 (18) High Level } → CN202 (11) High Level → Q210 ON → RY202 (make)

7.3.5.4.3. BELL DETECTION CIRCUIT

1. Circuit Operation

The signal waveform for each point is indicated below. The signal (low level section) input to pin T1 of ASIC IC604 on the digital board is read by ASIC and judged as a bell.
TEL LINE → PC204 (1, 2 - 4) → IC604 (T1)


Between the Tip and Ring from the telephone line
48V
about 150V
Between PC204 (1) and (2)
1.5V
0V
1.5V
PC204 (4)/ASIC IC604 (T1)
5V

7.3.5.4.4. CALLING LINE IDENTIFICATION CIRCUIT

1. Function

This unit is compatible with the Caller ID service offered by your local telephone company. To use this feature, you must subscribe to a Caller ID service. The data for the caller ID from the telephone exchange is sent during the interval between the first and second rings of the bell signal. The data from the telephone exchange is a modem signal which is modulated in an FSK (Frequency Shift Keying) format. Data “0” is a 1200 Hz sine wave, and data 1 a 2200 Hz sine wave.

There are two type of the message format which can be received: i.e.the single data message format and multiple data message format.

The multiple data format allows to transmit the name and data code information in addition to the time and telephone number data.

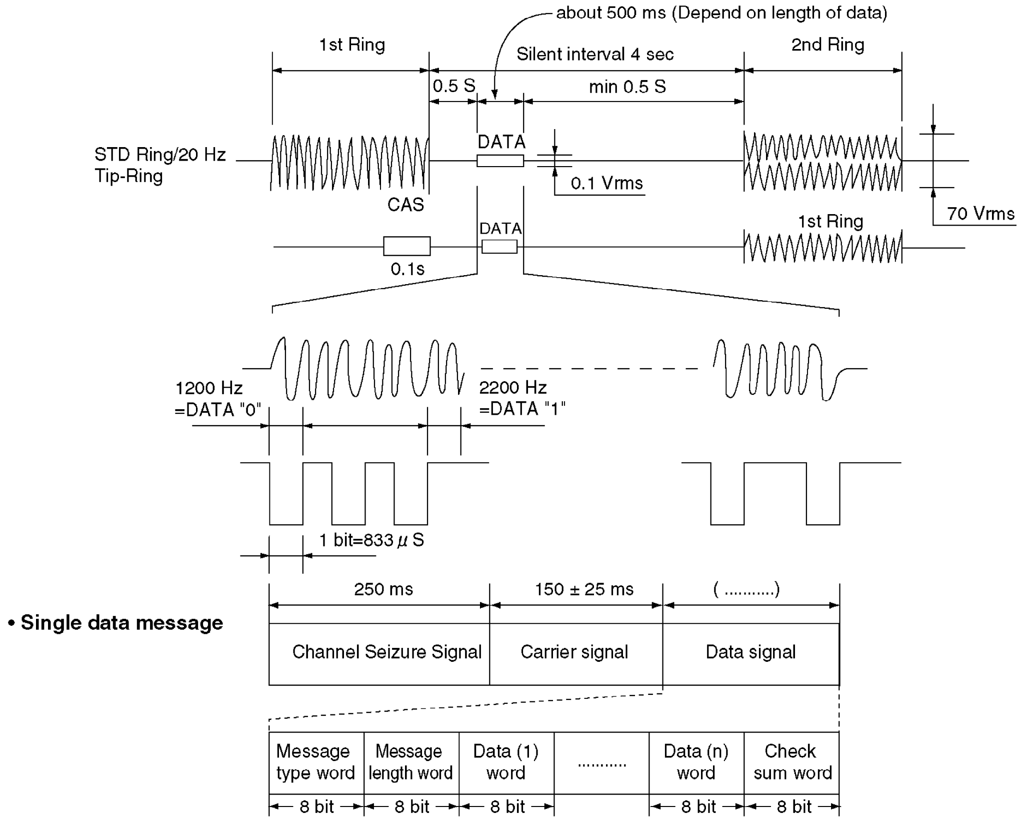
When there is multiple data in the unit, the name or telephone number are displayed.

2. Circuit Operation

The caller ID signal input from TEL LINE is processed with ASIC (IC604) via CODEC (IC609).

Refer to CHECK SHEET () for the route of caller ID signal.

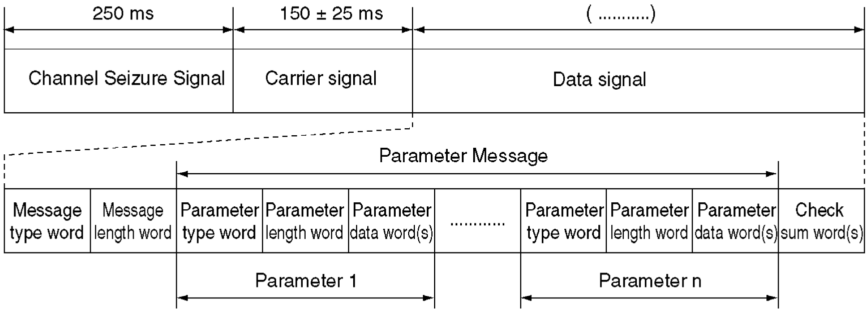
Timing Chart



about 500 ms (Depend on length of data)
1st Ring
Silent interval 4 sec
2nd Ring
0.5 S
min 0.5 S
STD Ring/20 Hz
Tip-Ring
DATA
0.1 Vrms
70 Vrms
CAS
DATA
1st Ring
0.1s
1200 Hz
=DATA "0"
2200 Hz
=DATA "1"
1 bit=833 µS
250 ms
150 ± 25 ms
(...........)
• Single data message
Channel Seizure Signal
Carrier signal
Data signal
Message type word
Message length word
Data (1) word
....
Data (n) word
Check sum word
8 bit
8 bit
8 bit
8 bit
8 bit

- •1 word = All 8 bit data
- •Message Type Word = Fixed value "00000100"
- •Message Length Word = number of the data word
- •Data word = The data value (month, day, hour, minute, telephone number)

· Multiple data message


250 ms
150 ± 25 ms
(...........)
Channel Seizure Signal
Carrier signal
Data signal
Parameter Message
Message type word
Message length word
Parameter type word
Parameter length word
Parameter data word(s)
....
Parameter type word
Parameter length word
Parameter data word(s)
Check sum word(s)
Parameter 1
Parameter n

·1 word = All 8 bit data
·Message Type = Fixed value "10000000"
·Message Length Word = number of the Parameter Message word
·Parameter Type Word = Kind of data (ex. the time, phone number)
·Parameter Length Word = number of the Parameter data word
·Parameter Word (s) = the data value

7.3.5.4.5. LINE AMPLIFIER AND SIDE TONE CIRCUIT

1. Circuit Operation

The reception signal output from the line transformer T203 is input to pin (6) of IC207 via R269, C285 and then the signal is amplified at pin (7) of IC207 and sent to the reception system at 8.1dB.

The transmission signal goes through C243, R276 and enters IC207-pin (2), where the signal is amplified to about 15.8dB. Then, it is output from pin (1) of IC207 and transmitted to T203 via C312, R293 and R292. Without a side tone circuit, the transmission signal will return to the reception amplifier via R269, C285. When the side tone circuit is active, the signal output from IC207 pin (1) passes through C312, R291, C306, R284, R280, C300, R267 and C288 and goes into the amplifier IC207 pin (5). This circuit is used to cancel the transmission return signal.

The TX signal is output to the circuit analog the route from the IC207 1 pin → C312 → R293 → R292 → T203 → TEL LINE.

However, if balance is lost in the bridge, a voltage occurs between the IC207 6 pin and 5 pin and a side tone results, because the balance cannot be maintained completely at all frequencies in the audio range some side tone always occur.

7.3.5.4.6. REMOTE FAX ACTIVATION CIRCUIT

1. Function

Another telephone connected to same line activates the unit to the FAX mode by using a DTMF signal.

2. Signal Path

TEL LINE → T203 → R269 → C285 → IC207(6-7) → C266 → C227 → R223 → IC201(20 → 31) → CN202 (4) → CN616 (25) → C723 → R707 → IC609 (13 → 22) → IC604 (P1)

7.3.5.4.7. TAM INTERFACE CIRCUIT

This circuit is to switch between FAX receiving and the external TAM's message recording automatically. This circuit consists of an EXT. TAM OFF-HOOK detect circuit, line transformer, multiplexer, amplifier.

For details, please refer TAM INTERFACE SECTION ().

7.3.5.5. ITS (Integrated telephone System) and MONITOR SECTION

7.3.5.5.1. GENERAL

The general ITS operation is performed by the special IC201 which has a handset circuit. The alarm tone, the key tone, and the beep are output from the ASIC IC604 (digital board).

7.3.5.5.2. TELEPHONE MONITOR

1. Function

This is the function when you are not holding the handset and can hear the caller's voice from the line.

2. Circuit Operation

(Telephone Monitor Signal Path)

Signals received from the telephone line are output through at the speaker via the following path.

3. Signal Path

Refer to CHECK SHEET.

7.3.5.5.3. HANDSET CIRCUIT

1. Function

This circuit controls the conversation over the handset, i.e. the transmitted and received voices to and from the handset.

2. Signal Path (Transmission signal)

Refer to CHECK SHEET.

3. Signal path (Reception signal)

Refer to CHECK SHEET.

7.3.5.5.4. MONITOR CIRCUIT

1. Function

This circuit monitors various tones, such as (1) DTMF tone, (2) Alarm/Beep/Key tone/Bell (3) Dummy ring back tone.

2. Signal Path

A. DTMF MONITOR

(Speaker Operation)

Refer to CHECK SHEET.

(Handset Operation)

Refer to CHECK SHEET.

B. ALARM/BEEP/KEY TONE/BELL

Refer to CHECK SHEET.

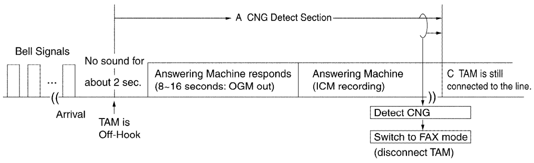
7.3.5.5.5. TAM INTERFACE SECTION

1. Function

The unit receives documents for FAX calls or the external TAM records a voice message automatically.

To switch between the answering machine and facsimile in the EXT. TAM Mode.

#	EXTERNAL TAM OPERATION	UNIT OPERATION
1	When the bell signal rings as many times as the number memorized into the connected answering machine (TAM), the answering machine is connected to the line and the answering message is sent out to the line. (OGM out for 8 ~ 16 sec.)	The length of the answering message should be 8~16 seconds. While the message is being played, the unit starts to detect the CNG signal.(A) If the unit detects the CNG signal, it will switch to FAX receiving and disconnect the external TAM automatically.
2	After sending the OGM, the answering machine starts to record the message of the other party (ICM recording).	If the unit detect the CNG signal or the unit will disconnect the line. (C)


A CNG Detect Section
Bell Signals
No sound for
about 2 sec.
Answering Machine responds
(8~16 seconds: OGM out)
Answering Machine
(ICM recording)
C TAM is still
connected to the line.
Arrival
TAM is
Off-Hook
Detect CNG
Switch to FAX mode
(disconnect TAM)

2. Circuit Operation

The TAM INTERFACE circuit consists of an EXT. TAM HOOK detection circuit, CNG signal from the other party’s detection circuit and RY202 (to separate EXT. TAM).

A. EXT. TAM HOOK detection circuit

A bell is received at EXT. TAM and EXT. TAM is connected to the line, making a DC LOOP. Then, PC205 detects this voltage. During detection, PC206 (4) becomes low.

(DC LOOP)
Tip → F201 → L235 → R331 → PC205(2-1) → L239 → T1 → R1 → L238 → RY202 → R330 → L236 → PO201 → Ring

B. CNG signal detection circuit

The CNG signal from the other party’s FAX is detected in ASIC IC604 via CODEC(IC609) (digital board).

(Signal path)

Refer to CHECK SHEET().

C. Remote receiving

This is the parallel-connected DTMF signal for the TEL or EXT.TEL mode between T and R. When the other party is a FAX, the unit switches to FAX receiving.

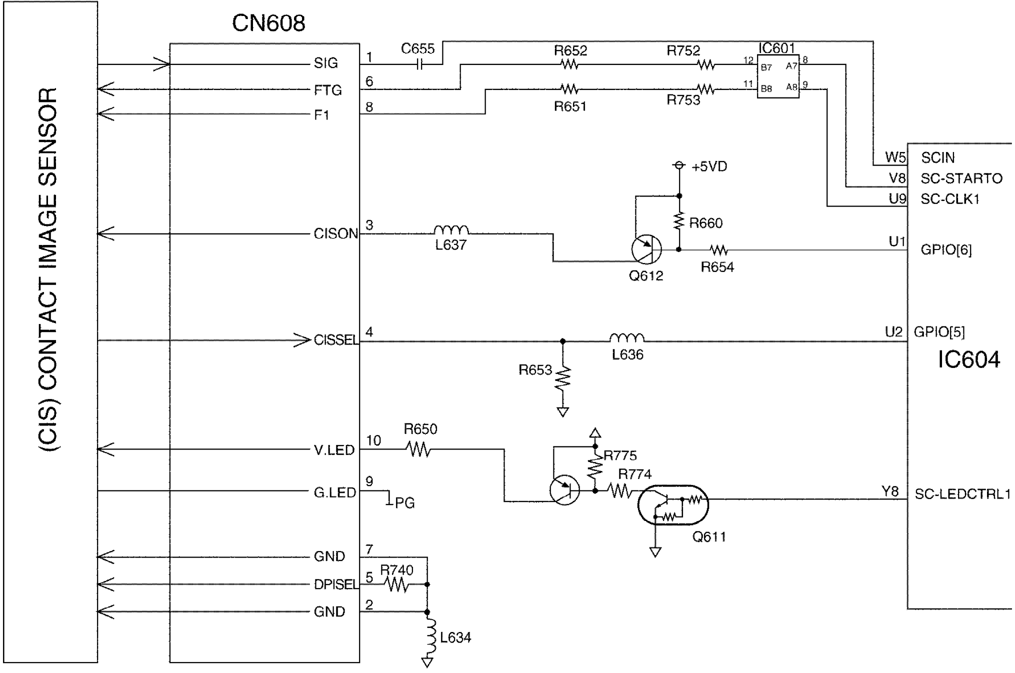
(Signal Path)

Detects the DTMF signal in the MODEM.

7.4. CIS CONTROL SECTION

The scanning block of this device consists of a control circuit and a contact image sensor made up of a celfoc lens array, an LED array, and photoelectric conversion elements.

Circuit Diagram


(CIS) CONTACT IMAGE SENSOR
CN608
SIG
FTG
F1
CISON
CISSEL
V.LED
G.LED
GND
DPISEL
GND
1
6
8
3
4
10
9
7
5
2
C655
R652
R752
IC601
B7
A7
B8
A8
12
11
8
9
R651
R753
+5VD
R660
L637
Q612
R654
W5
SCIN
V8
SC-STARTO
U9
SC-CLK1
U1
GPIO[6]
U2
GPIO[5]
IC604
L636
R653
R650
R775
R774
PG
Y8
SC-LEDCTRL1
Q611
R740
L634

When an original document is inserted and the start button pressed, pin Y8 of IC604 goes to a high level and the transistor Q611 turns on.This applies voltage to the LED array to light it. The contact image sensor is driven by each of the FTG-F1 signals output from IC604, and the original image illuminated by the LED array undergoes photoelectric conversion to output an analog image signal (SIG). The analog image signal is input to the system ASIC on SCIN (pin w5 of IC604) and converted into 8-bit data by the A/D converter inside IC604. Then this signal

undergoes digital processing in order to obtain a high-quality image.

7.5. STEPPING MOTOR DRIVE SECTION

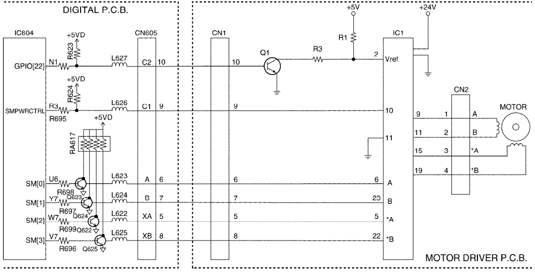
1. Functions

This motor functions for main operations including FAX transmission, FAX reception, copy, PC SCAN and PC PRINT.
This feed document or recording paper synchronized for reading or printing.
This machine switches between a scanning operation and a printing operation by a single motor.

2. Motor operation

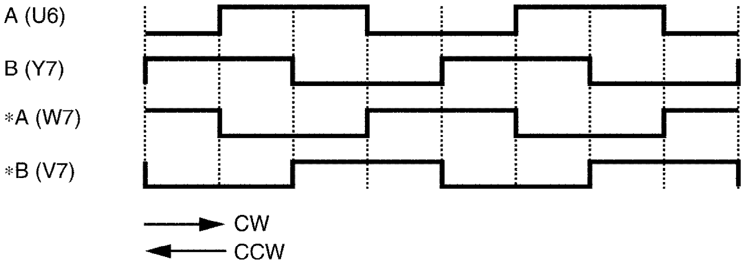
Excitation pulses is output from IC604 pins 172, 173, 174 and 175. Then stepping pulses are output from driver IC (IC1) pins 9, 11, 15 and 19, and drivers the motor coil.

Circuit Diagram

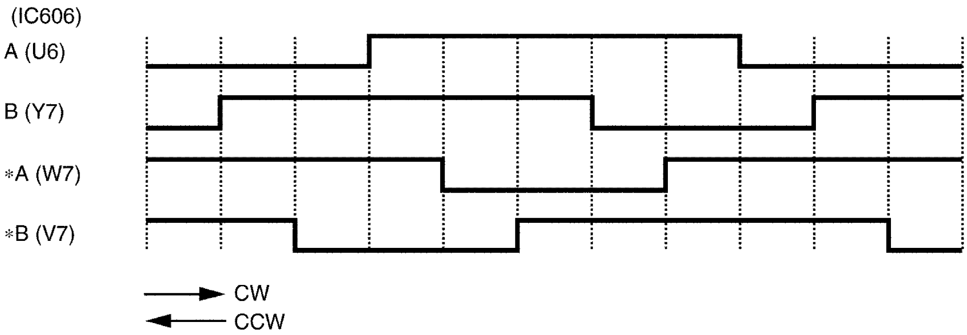

DIGITAL P.C.B.
IC604
GPIO[22]
SMPWRCTRL
SM[0]
SM[1]
SM[2]
SM[3]
N1
R3
R695
U6
Y7
W7
V7
R698
R697
R699
R696
Q623
Q624
Q622
Q625
+5VD
R623
R624
RA617
L627
L626
L623
L624
L622
L625
CN605
C2
C1
A
B
XA
XB
10
9
6
7
5
8
CN1
Q1
R3
R1
+5V
+24V
IC1
Vref
2
10
11
6
23
5
22
A
B
*A
*B
9
11
15
19
CN2
1
2
3
4
MOTOR
MOTOR DRIVER P.C.B.

7.5.1. TIMING CHART

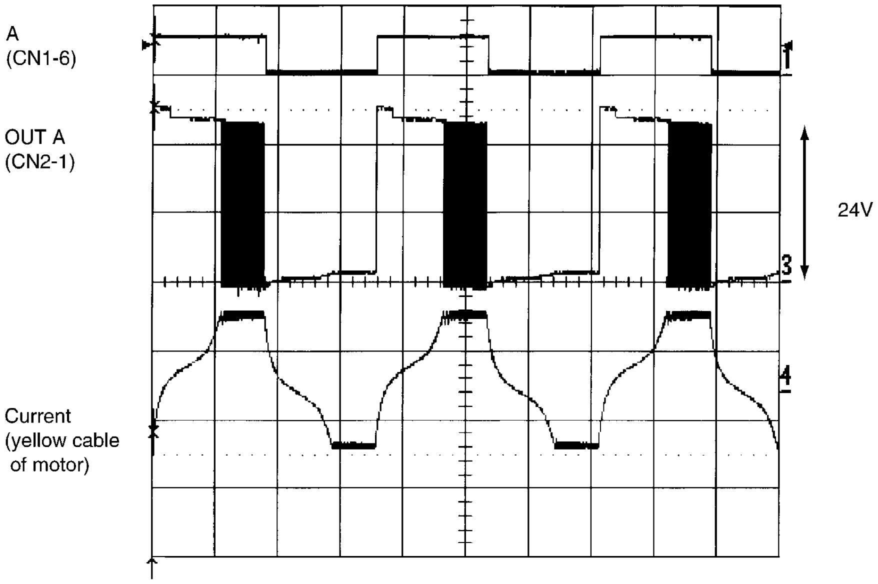
① 2 phase excitation



② 1-2 phase excitation

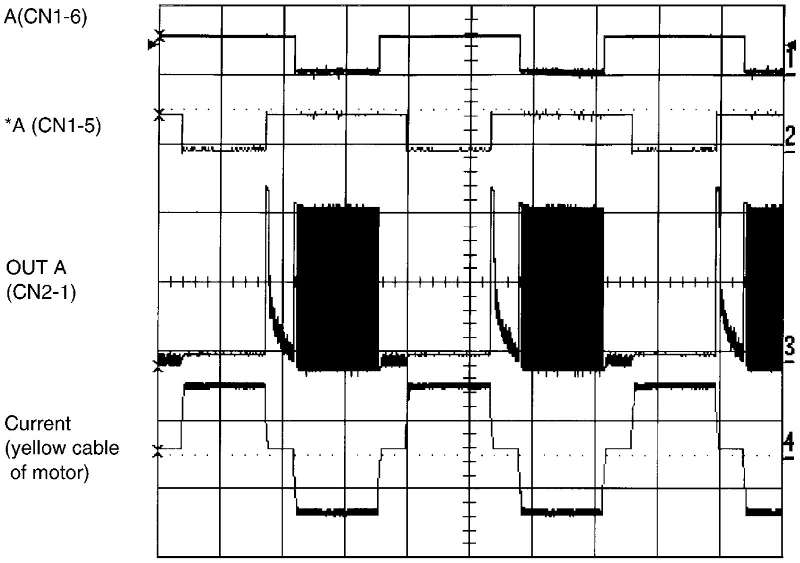


③ 2 phase excitation output waveform (example "A Phase")



Other phase (B, *A, *B) operates as A phase does.

④ 1-2 phase excitation waveform (example "A Phase")



When cheking "OUT *A, exchange input A and *A shown drawing above and observe "OUT *A(CN2-2)".
So, the display shows the same waveform as "OUT A" shown drawing above.

Other phase "B and *B" operates as "A and *A" phase does.

7.5.2. SWITCHING CURRENT

Switching Current

According to the operation mode, this machine changes a current value that will flow to the motor so as to reduce a vibration.The current value can be changed as follows by using the two ports (R3PIN and N1PIN) of IC604.

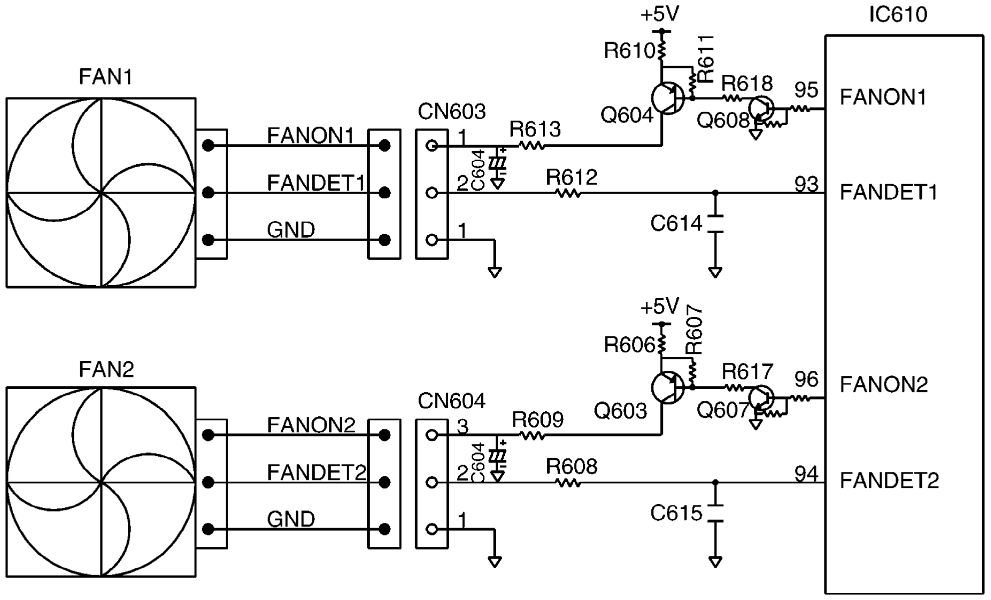
		IC604-R3PIN	
		0	1
IC604-N1PIN	0	100% Current	70% Current
	1	40% Current	35% Current
<100% = IA (ampere)>			

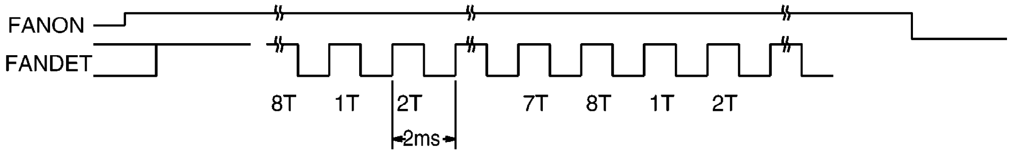
7.5.3. DRIVE MODE

FUNCTION		MODE	PHASE PATTERN	SPEED	CURRENT
PRINT		-	2 phase	743pps	100%
SCAN	FAX	STANDARD	2 phase	500pps	100%
SCAN	FAX/COPY	FINE/HALF TONE	2 phase	250pps	70%
SCAN	FAX	SUPER FINE	1-2 phase	250pps	40%
SCAN	COPY	SUPER FINE	1-2 phase	156pps	40%
SCAN	DOC.PREFEED	-	2 phase	250pps	100%
SCAN	DOC.EJECT	-	2 phase	500pps	100%

7.6. FAN MOTOR SECTION

Those two FAN are one used to radiate heat in the unit.
The signal level at pin 95/96 of IC610 becomes high, the FAN is activated.In this case, the pulse signal as shown below input to pin 27 of IC606 and the rotation of the FAN is detected.


+5V
IC610
R610
R611
FAN1
R618
95
FANON1
Q604
Q608
CN603
R613
FANON1
1
FANDET1
C604
R612
93
FANDET1
2
GND
1
C614
+5V
R606
R607
FAN2
R617
96
FANON2
Q603
Q607
CN604
R609
FANON2
3
FANDET2
C604
R608
94
FANDET2
2
GND
1
C615

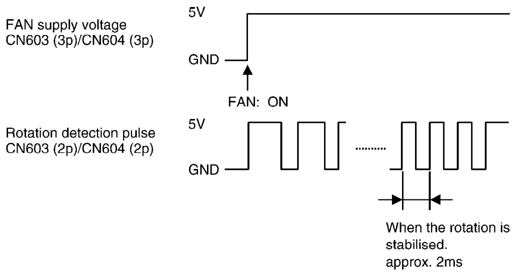

FANON
FANDET
8T
1T
2T
2ms
7T
8T
1T
2T

Mode	IC610-95/96pin	IC610-93/94pin
FAN ON	low level	pulse
FAN ON (NG)	low level	fix (H or L)
FAN OFF	high level	fix (H or L)

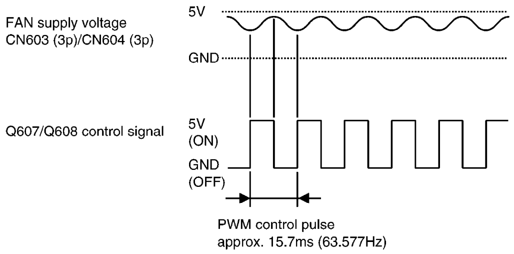
7.6.1. FAN CONTROL

This unit is equipped with two fans to prevent the developing device from rising in temperature while printing.
The air is inhaled from the side and front of the unit.
The fan rotates at high speed (typ. 7000 rpm) while printing (controlling the developing device).
After printing is finished, it rotates at low speed when the temperature of the unit goes up over a fixed one or depending on the number of printed papers (frequency).
While the fan is rotating at high speed, the voltage of 5 V is supplied to the fan, however, while rotating at low speed, the supply voltage is decreased to slow down the rotation turning ON/ OFF Q607 and Q608 with PWM control.
Each signal wave is as follows:

1. High-speed rotation (typ. 7000 rpm)


FAN supply voltage
CN603 (3p)/CN604 (3p)
5V
GND
FAN: ON
Rotation detection pulse
CN603 (2p)/CN604 (2p)
5V
GND
When the rotation is stabilised.
approx. 2ms

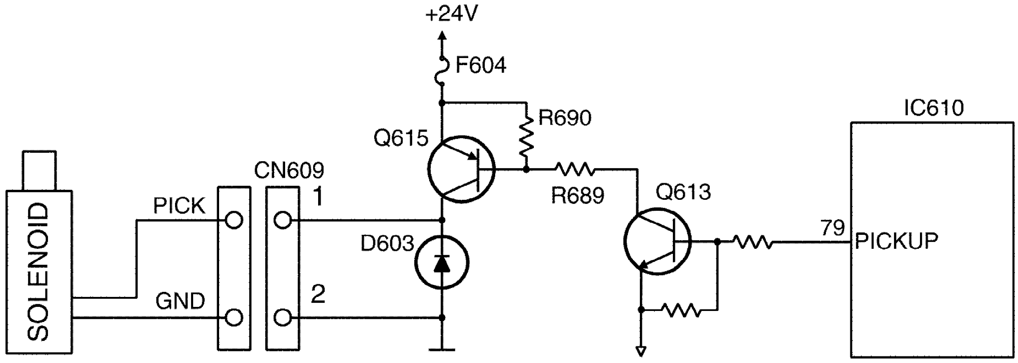
2. Low-speed rotation


FAN supply voltage
CN603 (3p)/CN604 (3p)
5V
GND
Q607/Q608 control signal
5V
(ON)
GND
(OFF)
PWM control pulse
approx. 15.7ms (63.577Hz)

During low-speed rotation, the rotation detection does not function.

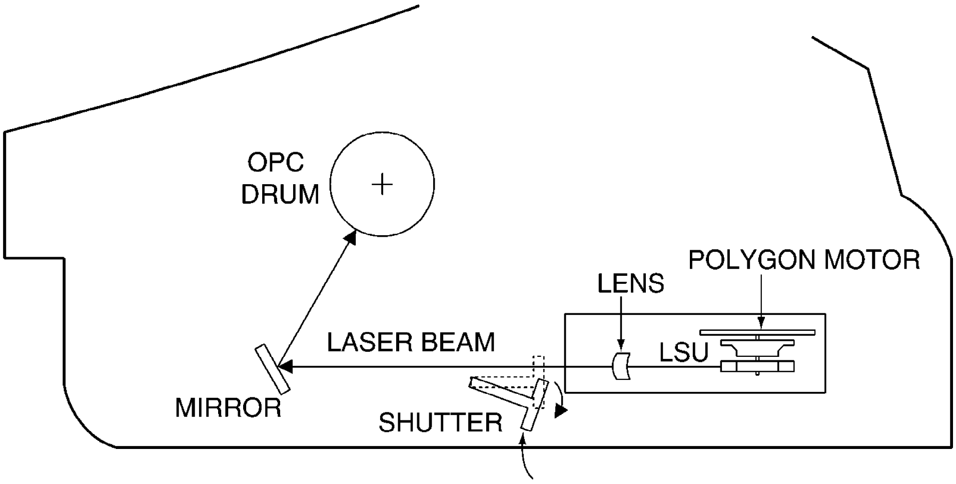
7.7. SOLENOID DRIVE SECTION

The solenoid drive circuit controls the pick-up clutch.
The solenoid is designed to be driven by +24V, driven by IC610-79 pin.
Diode D603 protects Q615 from backward voltage when the solenoid is driven.

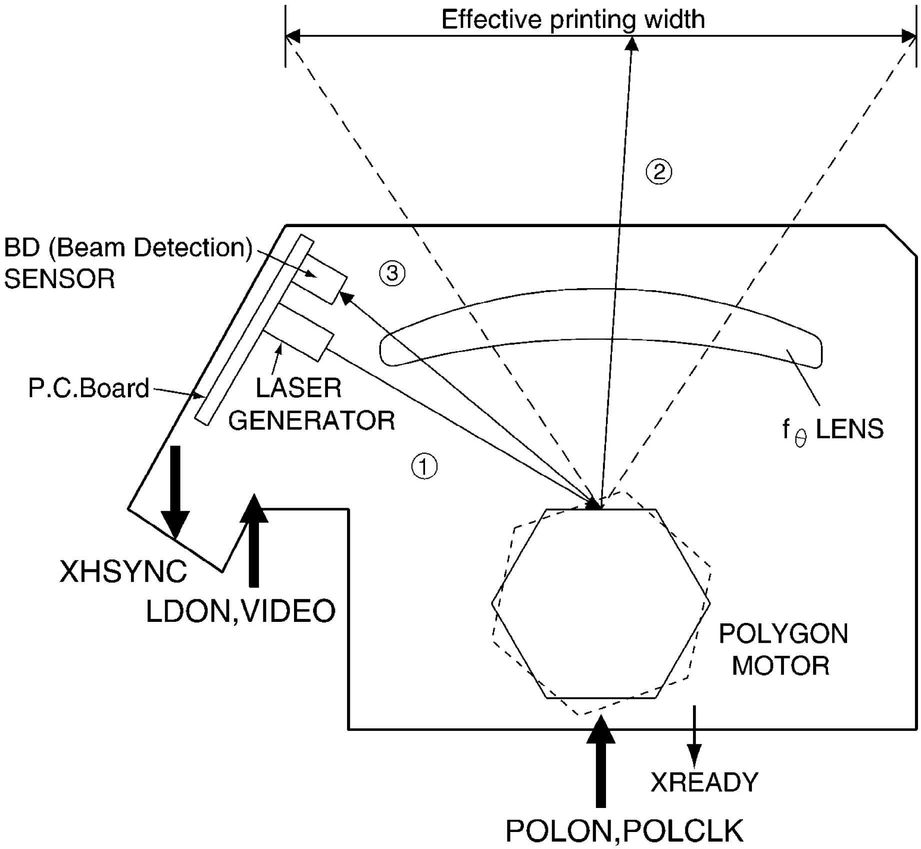

+24V
F604
R690
IC610
Q615
CN609
R689
Q613
PICK
1
D603
79
PICKUP
SOLENOID
GND
2

Mode	IC606-149 pin
SOLENOID ON	high level
SOLENOID OFF	low level

7.8. LSU (Laser Scanning Unit) SECTION

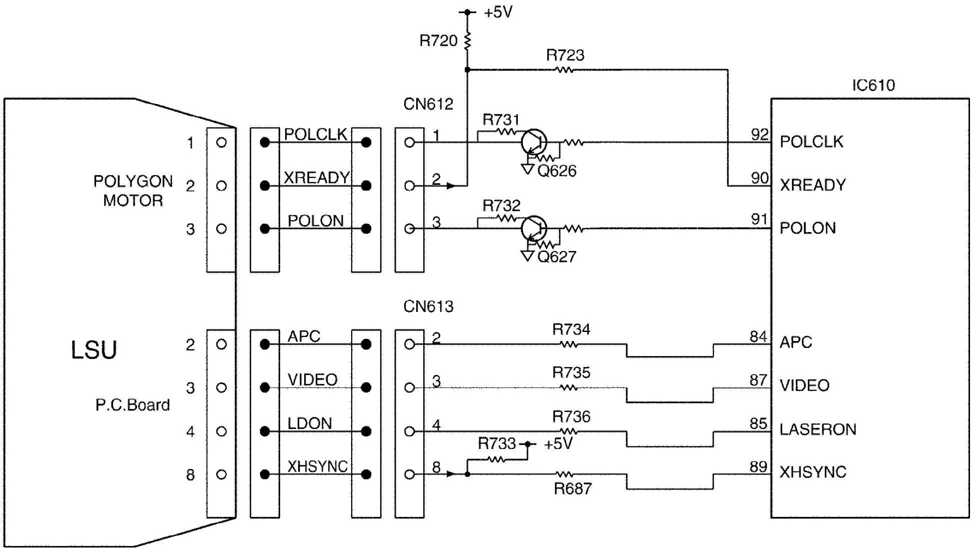

OPC
DRUM
POLYGON MOTOR
LENS
LASER BEAM
LSU
MIRROR
SHUTTER

The mechanical shutter will be opened by setting LSU properly.

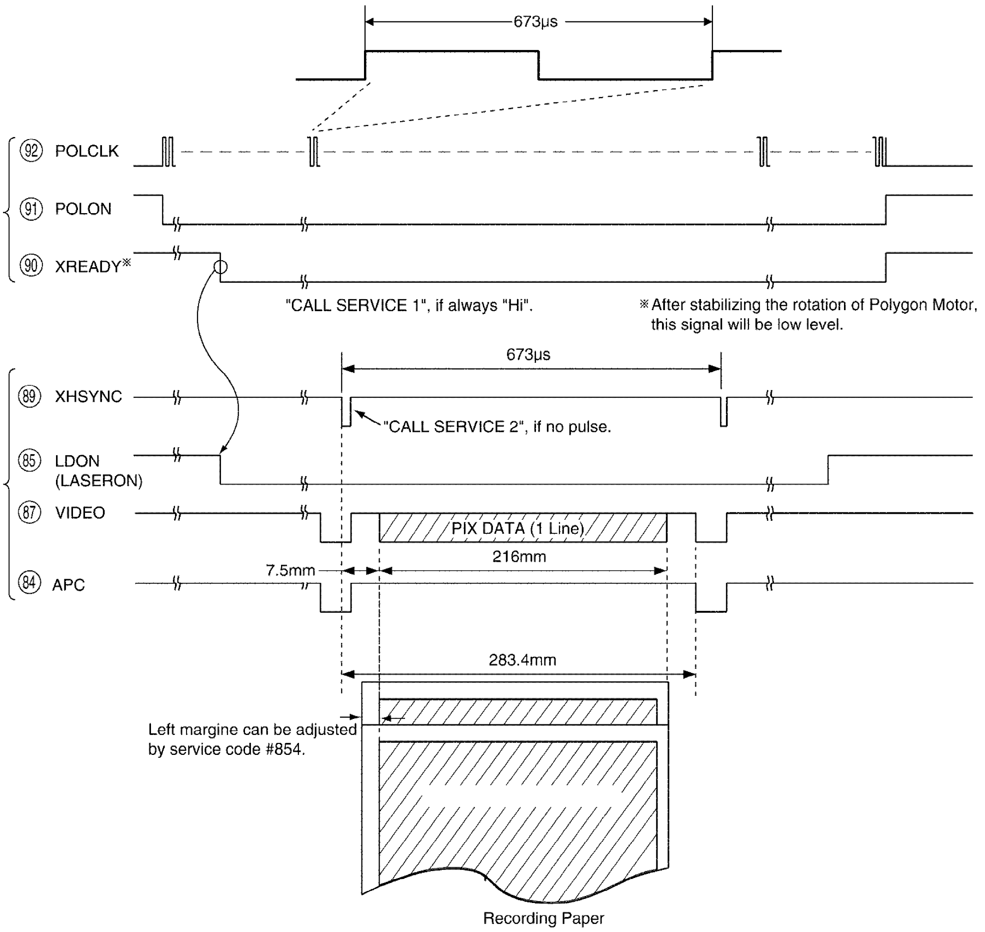

Effective printing width
②
BD (Beam Detection)
SENSOR
③
P.C.Board
LASER
GENERATOR
f θ LENS
①
XHSYNC
LDON,VIDEO
POLYGON
MOTOR
XREADY
POLON,POLCLK

① Laser output
② Laser reflecting on the drum
③ Laser towards the effective printing outside range onto the sensor

Circuit Diagram


+5V
R720
R723
IC610
CN612
R731
POLYGON MOTOR
1
2
3
POLCLK
XREADY
POLON
Q626
R732
Q627
92 POLCLK
90 XREADY
91 POLON
CN613
LSU
P.C.Board
APC
VIDEO
LDON
XHSYNC
R734
R735
R736
R733
+5V
R687
2
3
4
8
84 APC
87 VIDEO
85 LASERON
89 XHSYNC

Timing Chart


673µs
(92) POLCLK
(91) POLON
(90) XREADY※
"CALL SERVICE 1", if always "Hi".
※After stabilizing the rotation of Polygon Motor, this signal will be low level.
673µs
(89) XHSYNC
"CALL SERVICE 2", if no pulse.
(85) LDON (LASERON)
(87) VIDEO
PIX DATA (1 Line)
216mm
7.5mm
(84) APC
283.4mm
Left margine can be adjusted by service code #854.
Recording Paper

7.9. SENSORS AND SWITCHES SECTION

All of the sensor and switches are shown below.

Sensor Circuit Location	Sensor	Sensor or Switch Name	Message Error
Operation Panel	PS102	Document	[CHECK DOCUMENT]
Operation Panel	PS103	Paper Feed	[REMOVE DOCUMENT]
High Voltage PCB	SW101	Printer Open	[COVER OPEN]
High Voltage PCB		OPC Set	[CHECK DRUM]
High Voltage PCB	PC201	Register	[FAILED PICK UP]
Motor Driver PCB	PS1	Paper	[OUT OF PAPER]
Sensor PCB	PS50	Exit	[PAPER JAMMED]
Analog PCB	PS200	Toner	[TONER EMPTY] / [TONER LOW] [CHANGE DRUM]
Analog PCB	SW200	Hook	————

Note:
See TEST FUNCTIONS - SENSOR CHECK SECTION for the sensor test.
(#815 of Service Mode test. Refer to TEST FUNCTIONS ().)

7.9.1. DOCUMENT SENSOR...."CHECK DOCUMENT"

The Sensor detects whether or not a document is in place.
When a document is detected, the shelter plate shuts off the sensor light, the photo-transistor turns OFF, and the input signal of IC101-9 pin becomes a low level. When there is no document, the shelter plate let the sensor light pass through, the photo-transistor turns ON, and the input signal of IC101-9 pin becomes a low level.

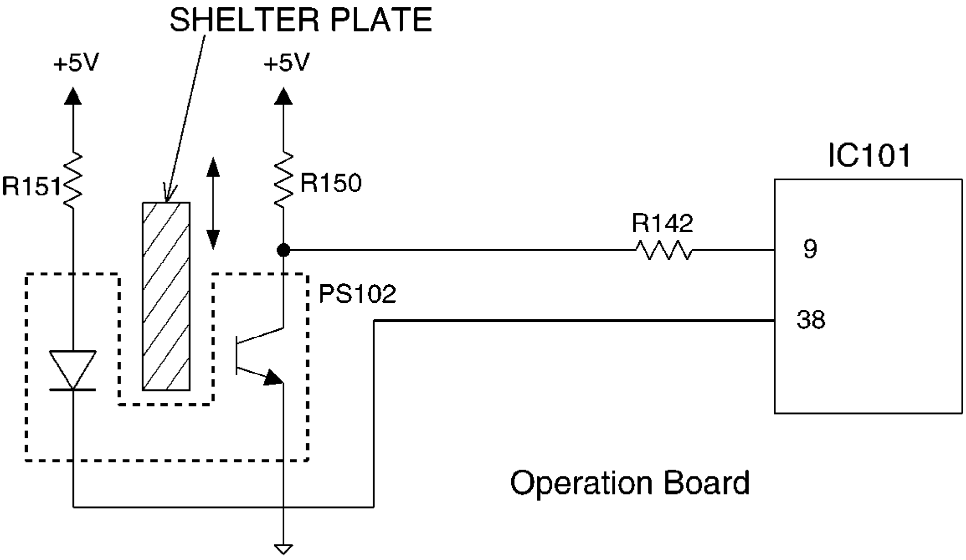
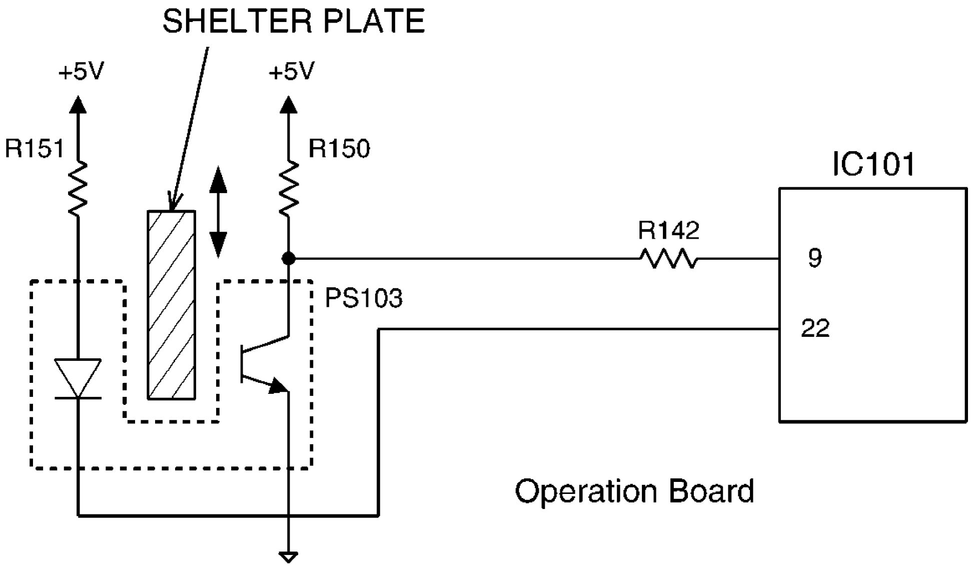


	Photo-transistor	Signal (IC101-9 pin)
Document Set	OFF	High level
No Document	ON	Low level

7.9.2. PAPER FEED SENSOR...."REMOVE DOCUMENT"

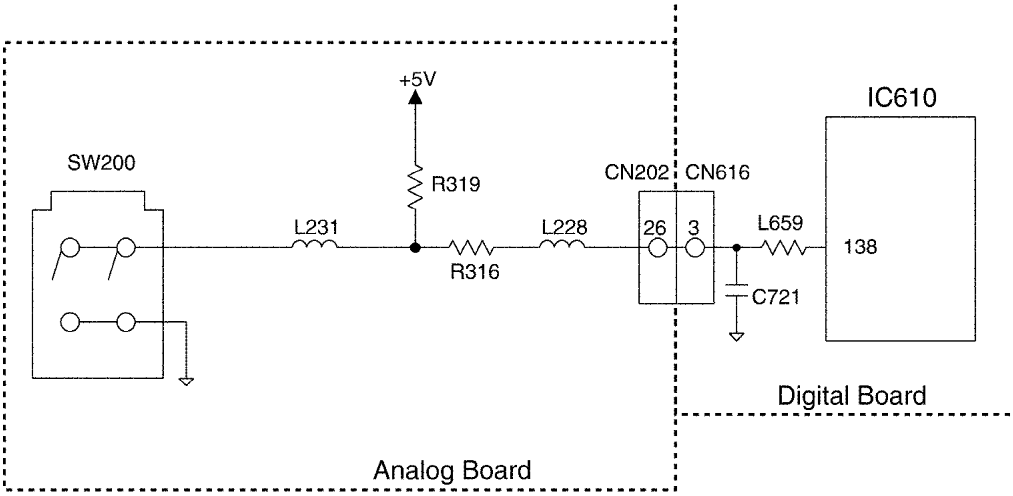
The Sensor detects the front edge of the document.
When a document is detected, the shelter plate shuts off the sensor light, the photo-transistor turns OFF, and the input signal of IC101-9 pin becomes a high level. When there is no document, the shelter plate let the sensor light pass through, the photo-transistor turns ON, and the input signal of IC101-9 pin becomes a low level.



	Switch	Signal (IC101-9 pin)
Read Position	OFF	High level
Non Read Position	ON	Low level

7.9.3. HOOK SWITCH

When the handset is raised, the switch is turned ON, and the signal at pin 57 of IC606 is low.
When the handset is returned, the switch is turned OFF, and the signal at pin 57 of IC606 is high.

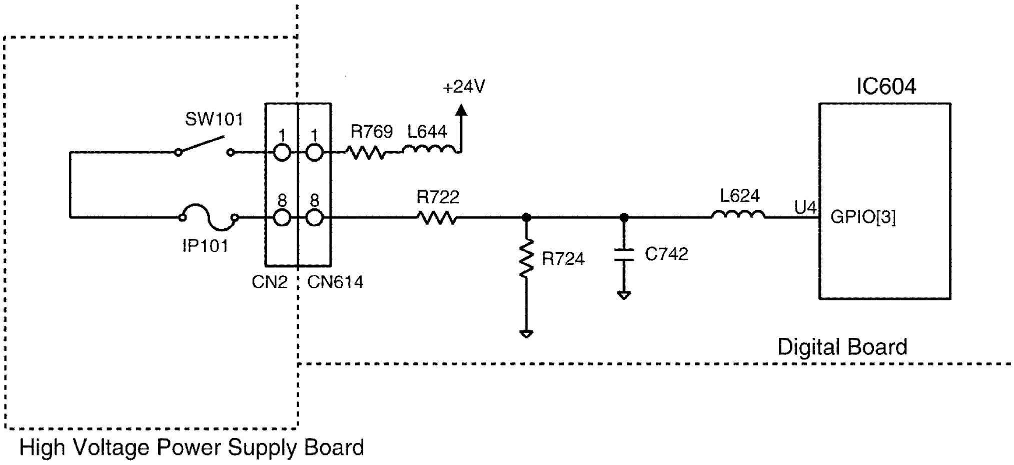

+5V
IC610
SW200
R319
CN202
CN616
L231
L228
26
3
L659
138
R316
C721
Digital Board
Analog Board

7.9.4. TOP COVER OPEN SWITCH...."COVER OPEN"

The Switches detect whether the printer cover is open or closed.

When the printer cover is closed, the switches turn ON, and the input signal of IC604-U4 pin becomes a high level.

When the printer cover is open, the switches turns OFF, and the input signal of IC604-U4 pin becomes a low level.


+24V
IC604
SW101
1
1
R769
L644
8
8
R722
L624
U4
GPIO[3]
IP101
R724
C742
CN2
CN614
Digital Board
High Voltage Power Supply Board

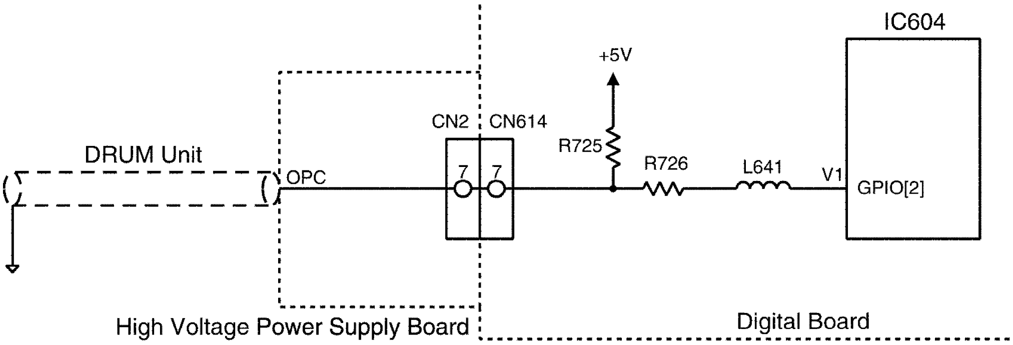
	Switch	Signal (IC604-U4 pin)
Open	OFF	Low level
Close	ON	High level

7.9.5. DRUM SENSOR...."CHECK DRUM"

The Switch detects whether the DRUM unit is set or not.

When there is the DRUM unit, the input signal of IC604-V1 pin becomes a low level.

When there is no DRUM unit, the input signal of IC604-V1 pin becomes a high level.


IC604
+5V
CN2
CN614
DRUM Unit
OPC
R725
R726
L641
V1
GPIO[2]
7
7
High Voltage Power Supply Board
Digital Board

	Signal (IC604-V1 pin)
DRUM Set	Low level
No DRUM	High level

7.9.6. RESISTOR SENSOR....."FAILED PICK UP"

The Sensor detects whether or not the recording paper is present so that printing can start.
When the recording paper is detected, the shelter plate let the sensor light passing through, the photo-transistor turns ON, and the input signal of IC610-154 pin becomes a low level.
When there is no recording paper, the shelter plate closes the sensor light, the photo-transistor turns OFF, and the input signal of IC610-154 pin becomes a high level.

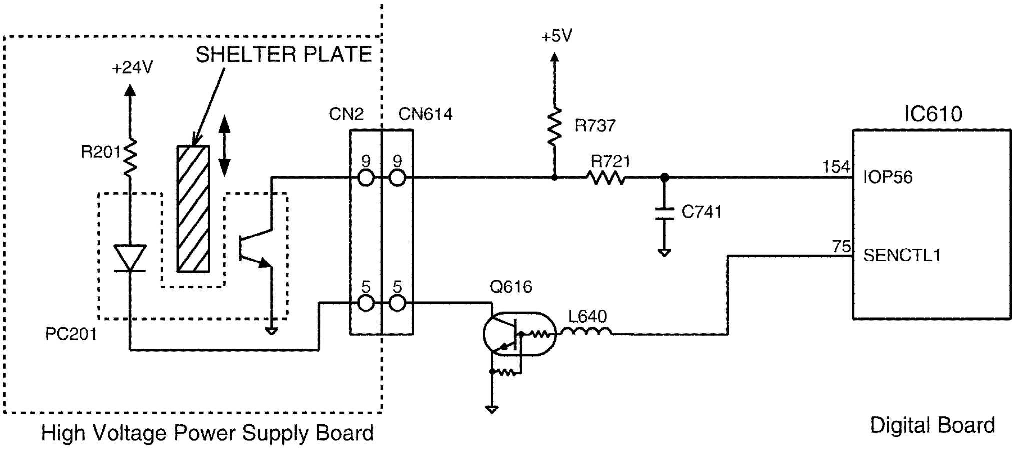
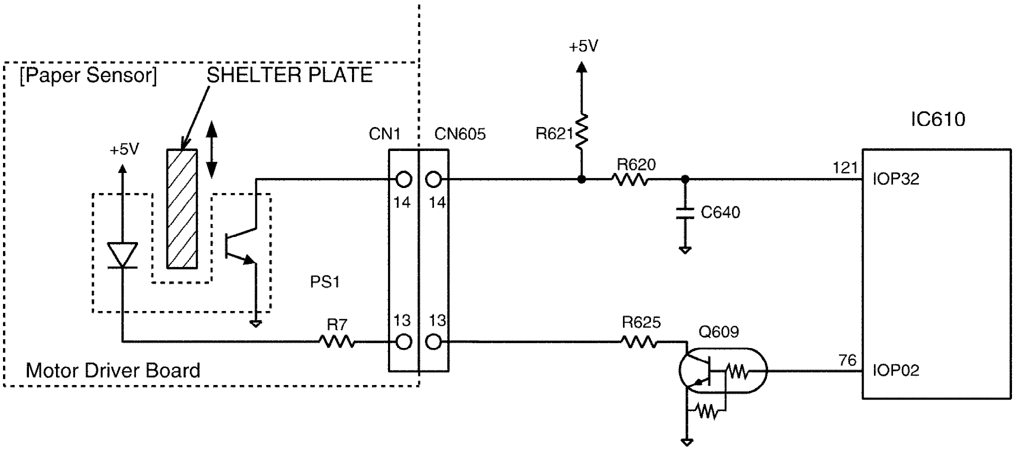

+5V
SHELTER PLATE
+24V
CN2
CN614
R737
IC610
R201
9
9
R721
154
IOP56
C741
75
SENCTL1
5
5
Q616
L640
PC201
High Voltage Power Supply Board
Digital Board

	Photo-transistor	Signal (IC610-154 pin)
No Recording Paper	OFF	High level
Recording Paper Regist	ON	Low level

7.9.7. PAPER EXIT SENSOR ....."OUT OF PAPER"

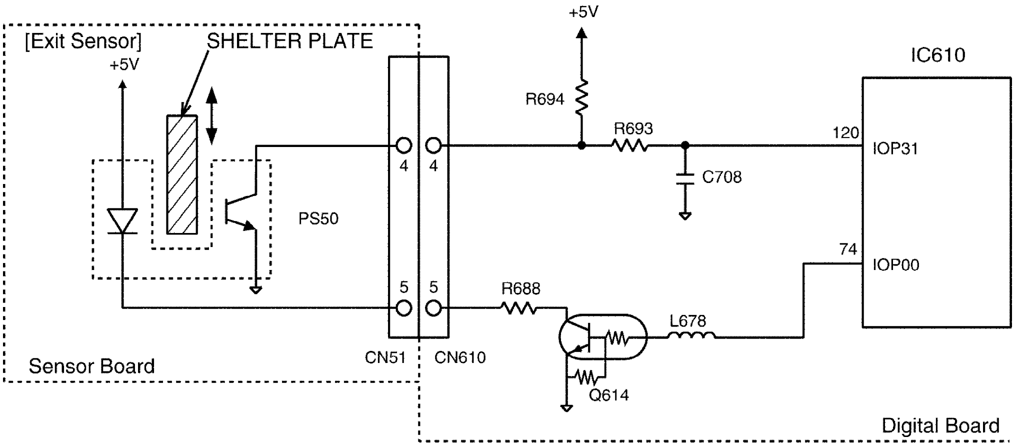
The Sensor detects the recording paper are in place.
When the recording paper is detected, the shelter plate let the sensor light passing through, the photo-transistor turns ON, and the input signal of IC610-121 pin becomes a low level.
When there is no recording paper, the shelter plate closes the sensor light, the photo-transistor turns OFF, and the input signal of IC610-121 pin becomes a high level.


[Paper Sensor]
SHELTER PLATE
+5V
PS1
R7
Motor Driver Board
CN1
CN605
14
14
13
13
+5V
R621
R620
C640
R625
Q609
IC610
121
IOP32
76
IOP02

[Paper Sensor]

	Photo-transistor	**Signal (IC606-178 pin)**
Recording Paper Set	**OFF**	**High level**
No Recording Paper	**ON**	**Low level**

7.9.8. PAPER EXIT SENSOR .....”PAPER JAMMED”


[Exit Sensor]
SHELTER PLATE
+5V
PS50
Sensor Board
CN51
CN610
4
4
5
5
+5V
R694
R693
C708
R688
Q614
L678
IC610
120
IOP31
74
IOP00
Digital Board

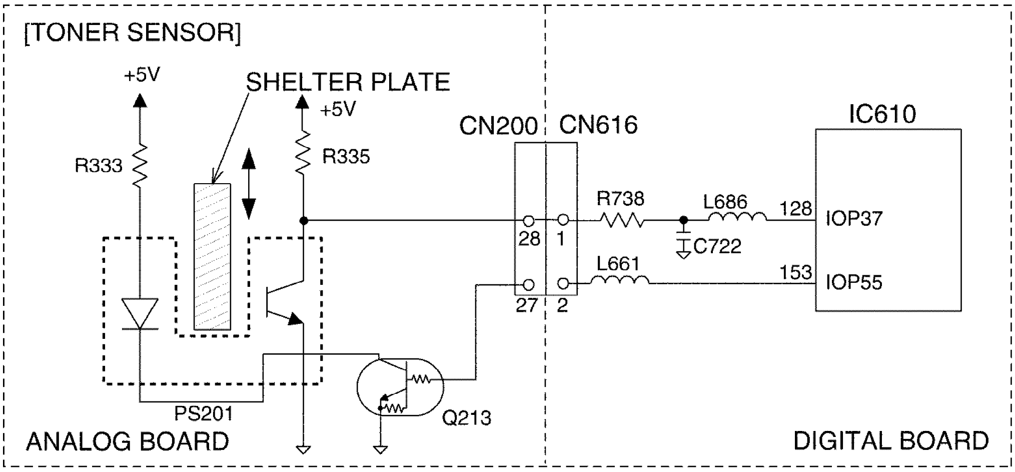
The sensor detects whether the recording paper exit out or noy.
When there is no recording paper at the position of the sensor, the shelter plate closes the sensor light, the photo-transistor fot tarus OFF, and the input sugnal of IC610-120pin becomes high level.
When the recording paper reach the exit sensor, the shelter plate let the sensor light passing through, the photo-trensistor ON, and the input signal of IC610-120pin becomes a low level.

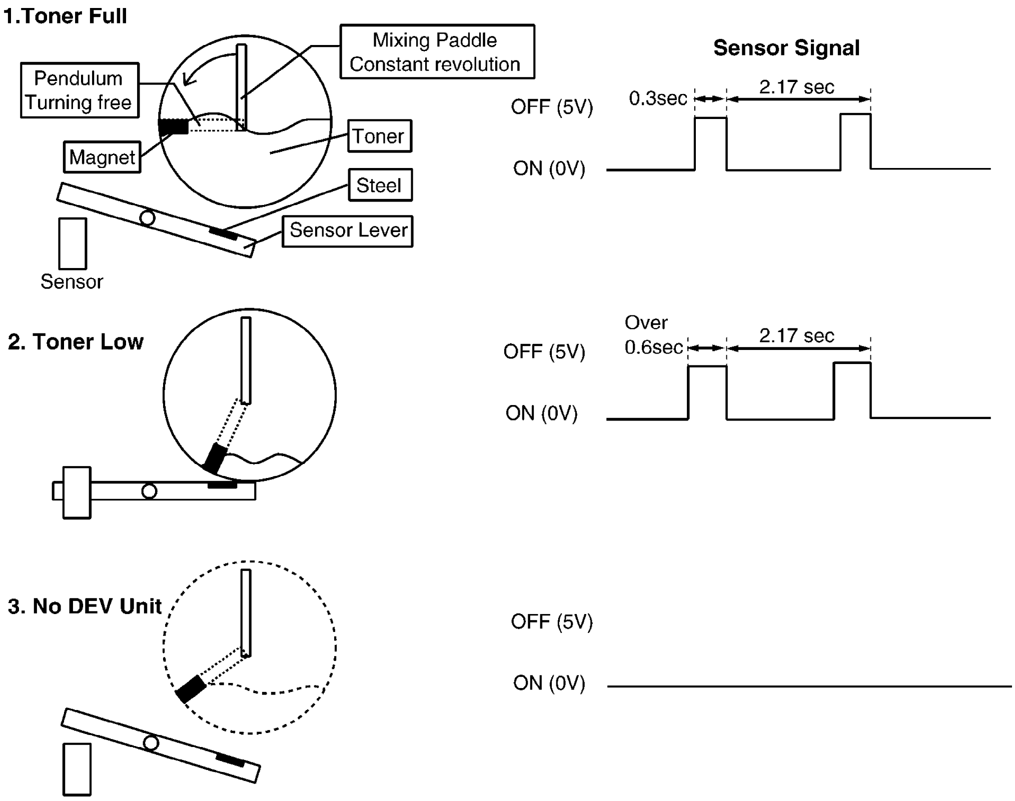
[Exit Sensor]

	Photo-transistor	Signal (IC606-179 pin)
No Paper	OFF	High level
Paper Exist	ON	Low level

7.9.9. TONER SENSOR...."TONER EMPTY", "TONER LOW", "CHANGE DRUM"

The Sensor detects whether or not the Developer unit and the toner are present.
When there is not Development unit, the shelter plate let the sensor light passing through, the photo-transistor turns ON, and the input signal of IC610-128 pin (Digital P.C.B) becomes a low level over 9s. When the Developer unit is set, the shelter plate move with rotation of development roller, so the photo-transistor turns ON/OFF. If the time of IC610-128 pin's high level is under 600ms, there is enough toner in Developer unit, if not, toner is near empty.


[TONER SENSOR]
+5V
SHELTER PLATE
+5V
R333
R335
CN200
CN616
IC610
R738
L686
128
IOP37
28
1
C722
L661
153
IOP55
27
2
PS201
Q213
ANALOG BOARD
DIGITAL BOARD

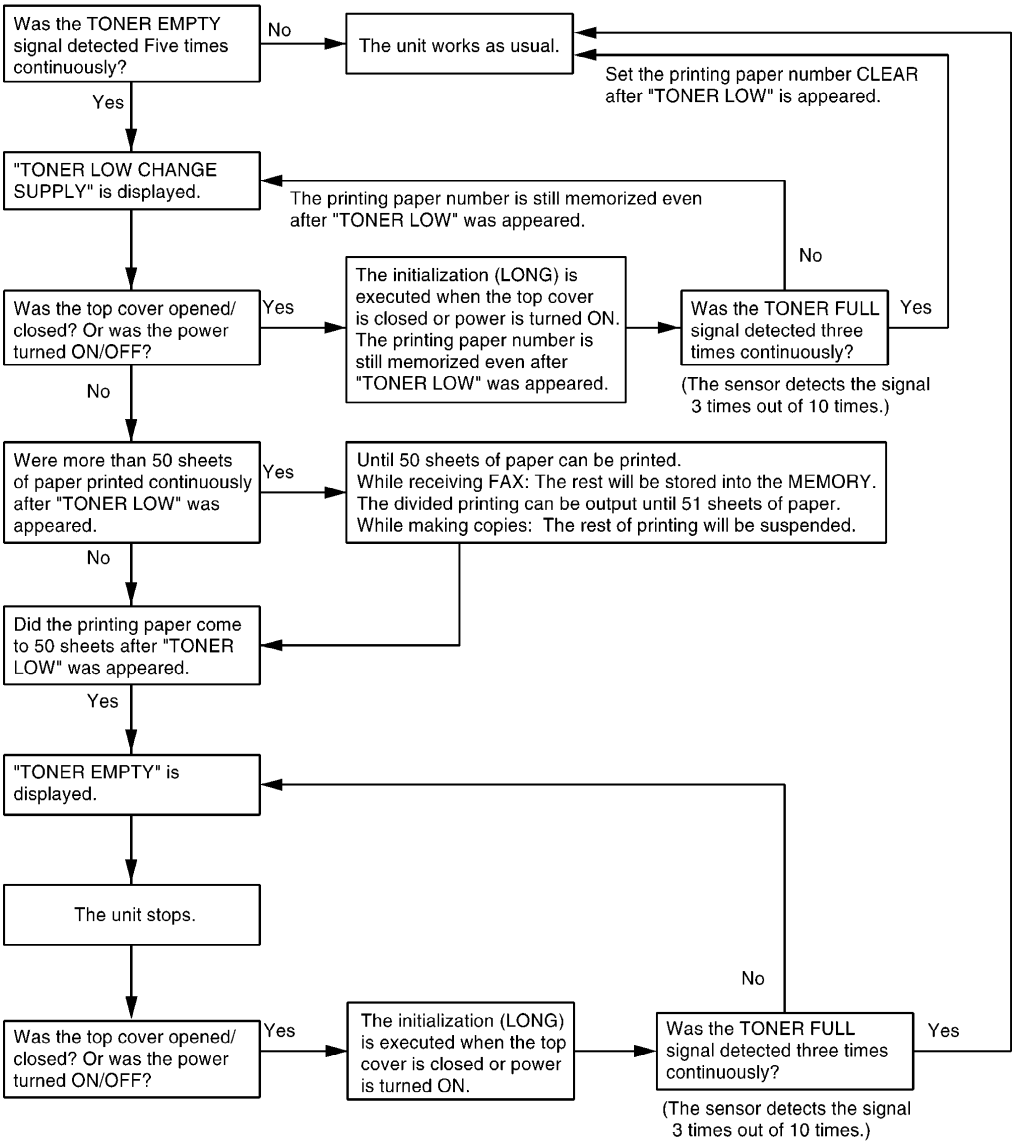

1.Toner Full
Pendulum Turning free
Mixing Paddle Constant revolution
Magnet
Toner
Steel
Sensor Lever
Sensor
Sensor Signal
OFF (5V)
ON (0V)
0.3sec
2.17 sec
2. Toner Low
OFF (5V)
ON (0V)
Over 0.6sec
2.17 sec
3. No DEV Unit
OFF (5V)
ON (0V)

Toner Sensor

The rest of toner is detected by the move speed of the magnet put on the pendulum of Mixing Paddle. The pendulum is pushed up by the Mixing Paddle, then it falls down by its own weight. The rotation speed of paddle is set slower than the one of pendulum which falls down by its own weight. When the toner is still left, the pendulum falls and stops on the toner, then pushed by the paddle, it starts to rotate. When no toner is left, the pendulum falls to the bottom. Consequently the contact time between the magnet and steel becomes short when toner is left and long with no toner.

State	Photo-transistor	Signal (IC610-128pin)
Toner Set (full)	OFF time=about 0.3s	High level=about 0.3s
Near Empty Toner	OFF time>0.6s	High level>0.6s
No DEV Unit ("CHANGE DRUM")	ON	Low level fix

7.9.9.1. TONER DETECTION FLOW

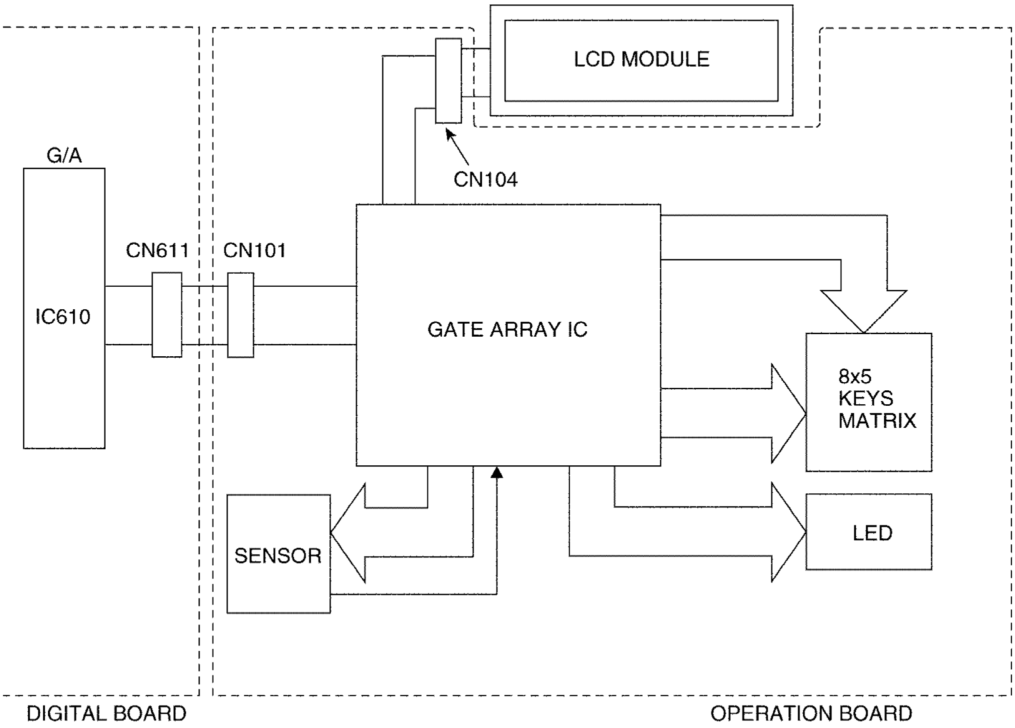

Was the TONER EMPTY signal detected Five times continuously?
No
The unit works as usual.
Set the printing paper number CLEAR after "TONER LOW" is appeared.
Yes
"TONER LOW CHANGE SUPPLY" is displayed.
The printing paper number is still memorized even after "TONER LOW" was appeared.
No
Was the top cover opened/ closed? Or was the power turned ON/OFF?
Yes
The initialization (LONG) is executed when the top cover is closed or power is turned ON. The printing paper number is still memorized even after "TONER LOW" was appeared.
Was the TONER FULL signal detected three times continuously?
Yes
(The sensor detects the signal 3 times out of 10 times.)
No
Were more than 50 sheets of paper printed continuously after "TONER LOW" was appeared.
Yes
Until 50 sheets of paper can be printed.
While receiving FAX: The rest will be stored into the MEMORY.
The divided printing can be output until 51 sheets of paper.
While making copies: The rest of printing will be suspended.
No
Did the printing paper come to 50 sheets after "TONER LOW" was appeared.
Yes
"TONER EMPTY" is displayed.
The unit stops.
No
Was the top cover opened/ closed? Or was the power turned ON/OFF?
Yes
The initialization (LONG) is executed when the top cover is closed or power is turned ON.
Was the TONER FULL signal detected three times continuously?
Yes
(The sensor detects the signal 3 times out of 10 times.)

CAUTION :

1. **Toner low can be judged by continuous 5-times TONER LOW signal at only printing.**
   (It is not executed at initialization.)
2. **Toner full can be judged by continuous 3-times TONER FULL signal at initialization.**
   (It is not executed at printing.)
3. **In the ordinal operation, “CHECK DRUM” is displayed when TONER EMPTY sensor does not generate a signal for 2.7 seconds.**

7.10. OPERATION BOARD SECTION

The unit consists of a LCD (Liquid crystal display), KEYs and LEDs (light-emitting diodes) and sensors. They are controlled by the Gate Array (IC101) and ASIC (IC606: on the DIGITAL BOARD).
The key matrix table is shown below.


LCD MODULE
CN104
G/A
IC610
CN611
CN101
GATE ARRAY IC
8x5
KEYS
MATRIX
SENSOR
LED
DIGITAL BOARD
OPERATION BOARD

1. Key Matrix (Hard only)

	KIN0	KIN1	KIN2	KIN3	KIN4	KIN5	KIN6	
KS0	9 / (SW101)	VOL- / (SW105)	AUTO/ / ANSWER / (SW109)	VOL+ / (SW113)	FLASH / (SW117)	# / (SW121)	6 / (SW125)	3
KS1	F2 / (SW102)	F5 / (SW106)	F4 / (SW110)	IQ-FAX (SW114)	MONITOR / (SW118)	F3 / (SW122)	F1 / (SW126)	
KS2	8 / (SW103)	QUICK SCAN / (SW107)	COLLATE / (SW111)	RESOLUTION / (SW115)	MUTE / (SW119)	0 / (SW123)	5 / (SW127)	2
KS3	7 / (SW104)	STOP / (SW108)	START / (SW112)	COPY / (SW116)	REDIAL/ PAUSE (SW120)	* / (SW124)	4 / (SW128)	1
KS4	-------	-------	MENU / (SW135)	F6 (LOWER) / (SW136)	SERACH / (SW137)	PRINT / (SW138)	RECORD / (SW139)	D

2. LED

- AUTO ANSWER LED ON/OFF port---LED6 (IC101-2)

3. Sensor

	LED ON/OFF port	Input port
PF sensor	LED1 (IC101-22)	XLD10 (IC101-9)
DOCUMENT sensor	LED4 (IC101-38)	XLD10 (IC101-9)

Refer to DOCUMENT SENSOR...."CHECK DOCUMENT" () and PAPER FEED SENSOR...."REMOVE DOCUMENT" ().

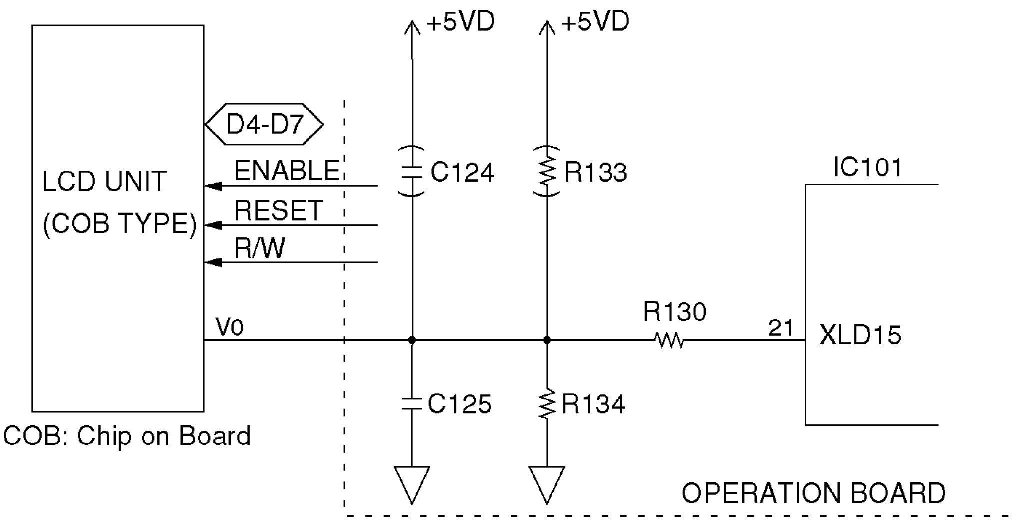
7.11. LCD SECTION

The Gate Array (IC101) works only for writing the ASCII code from the data bus (D4~D7). V0 is supplied for the crystal drive.

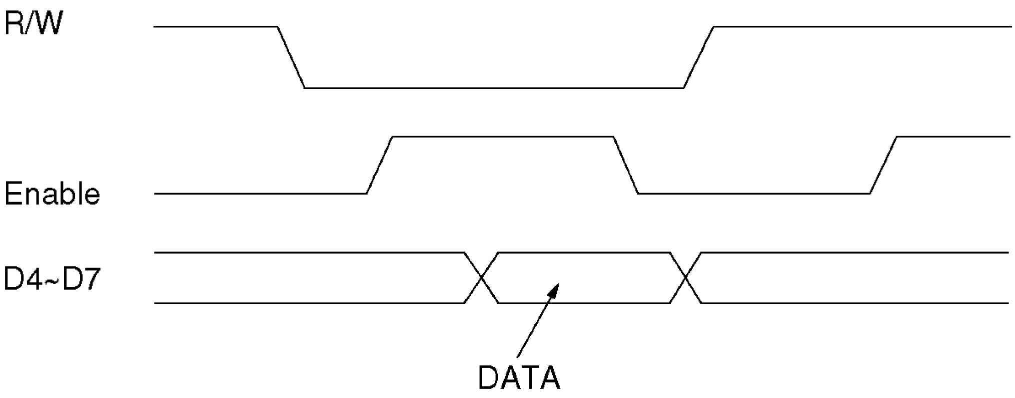
R130 and R134 are density control resistors.

Consequently, in this unit, the timing (positive clock) is generated by the LCD interface circuitry in the gate array (IC101).

Circuit Diagram


+5VD
+5VD
LCD UNIT
(COB TYPE)
D4-D7
ENABLE
RESET
R/W
C124
R133
IC101
V0
R130
21
XLD15
C125
R134
COB: Chip on Board
OPERATION BOARD

Timing Chart


R/W
Enable
D4~D7
DATA

Density	Normal	Dark
XLD15 (IC101-21pin)	H	L

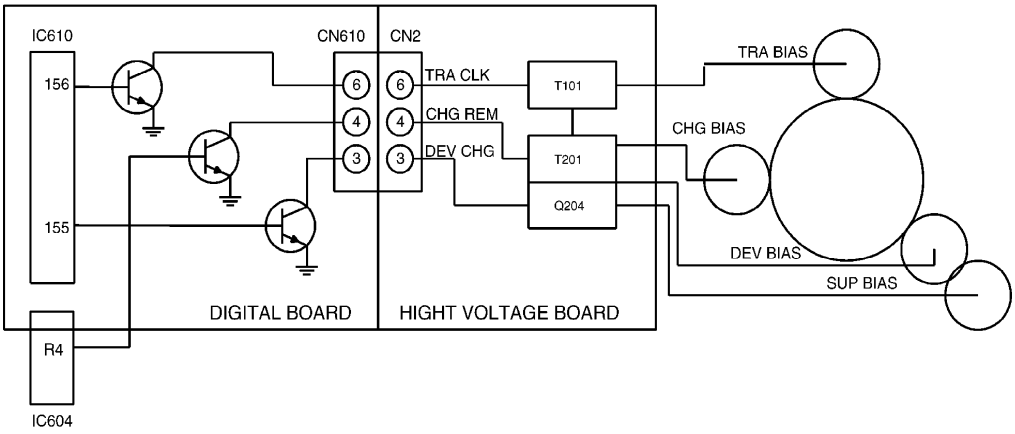
7.12. HVPS (High Voltage Power Supply) SECTION

7.12.1. HVPS SPECIFICATION

No	Output voltage	Item	Specification	Notes
1	Electrostatic Charge CHG BIAS	Ratet output voltage	-1200±35V	
		Impedance range	80M~1200MΩ	
		Output format	Constant voltage	
2	Developing DEV(-) BIAS	Ratet output voltage	-350±15V	
		Impedance range	20M~2000MΩ	
		Output format	Constant voltage	
	Developing DEV(+) BIAS	Ratet output voltage	+220+20-50V	
		Output format	Constant voltage	
3	Supply roller SUP BIAS	Ratet output voltage	-550±50V	
		Impedance range	20M~2000MΩ	
		Output format	Constant voltage	
4	Transfer TRA(+) BIAS	Variable output current	+4~30μA	Output current varies with the printed rate.
		Output voltage	+3500V Max.	
		Output format	Variable Constant current	
	Transfer TRA(-) BIAS	Ratet output voltage	-1200±100V	
		Output format	Constant voltage	

DEV BIAS is output from one of the output terminals after the DEV CHG signal selects DEV(+) BIAS and DEV(-) BIAS.
TRA BIAS is output from one of the output terminals after the TRA CLK signal selects TRA(+) BIAS and TRA(-) BIAS.

H.V.P.S.(High Voltage Power Supply) Circuit Diagram

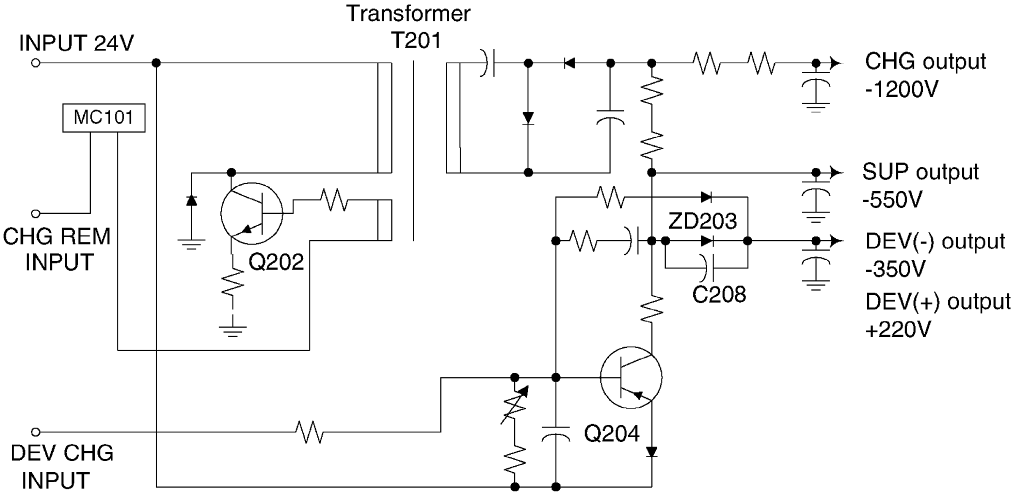


7.12.2. CHG-BIAS (Charge BIAS)/SUP BIAS (Supply BIAS)/DEV(-) BIAS (Developing(-) BIAS)/DEV(+) BIAS (Developing(+) BIAS) UNIT

When the CHG REM terminal becomes "L", the transistor Q202 turns ON by MC101, Charge BIAS(-1200V) is output from CHG OUTPUT, Supply BIAS(-550V) is output from SUP output, and Developing(-) BIAS(-350V) is output from DEV(-) BIAS.By performing the DEV(-) BIAS output, the

condenser C208 is charged with an electric charge. Charging the C208 will be saturated at 50ms. After that, when DEV CHG terminal becomes "L", Q204 turns ON, and the electric charge charged to the C208 is released. This electric charge becomes a constant voltage at ZD203, and Developing(+) BIAS(+220V) is output from DEV(+) BIAS.

Circuit Diagram

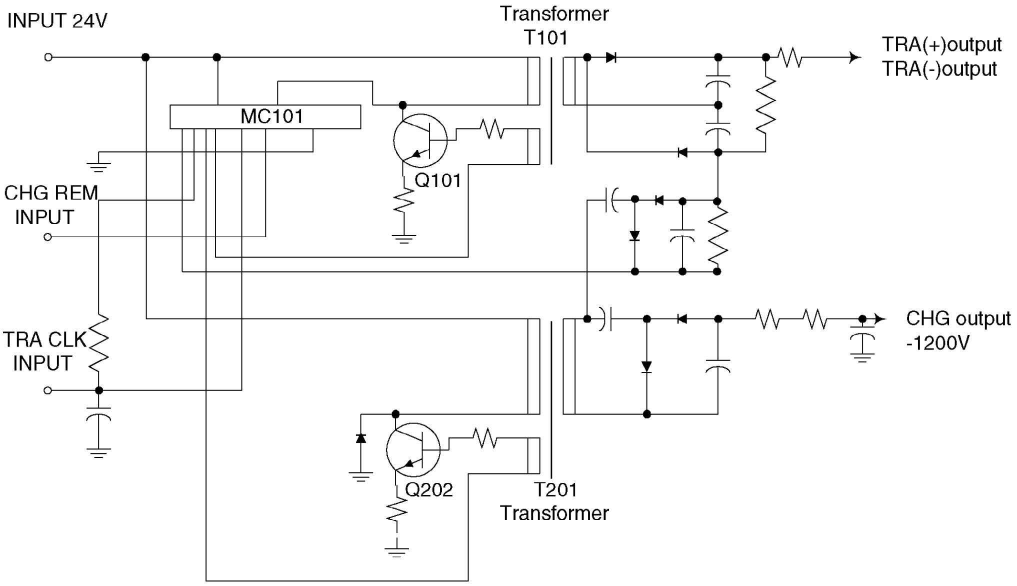


INPUT 24V
MC101
CHG REM INPUT
DEV CHG INPUT
Transformer T201
Q202
Q204
ZD203
C208
CHG output -1200V
SUP output -550V
DEV(-) output -350V
DEV(+) output +220V

7.12.3. TRA(+) BIAS (Transfer(+) BIAS)/TRA(-) BIAS (Transfer(-) BIAS) UNIT

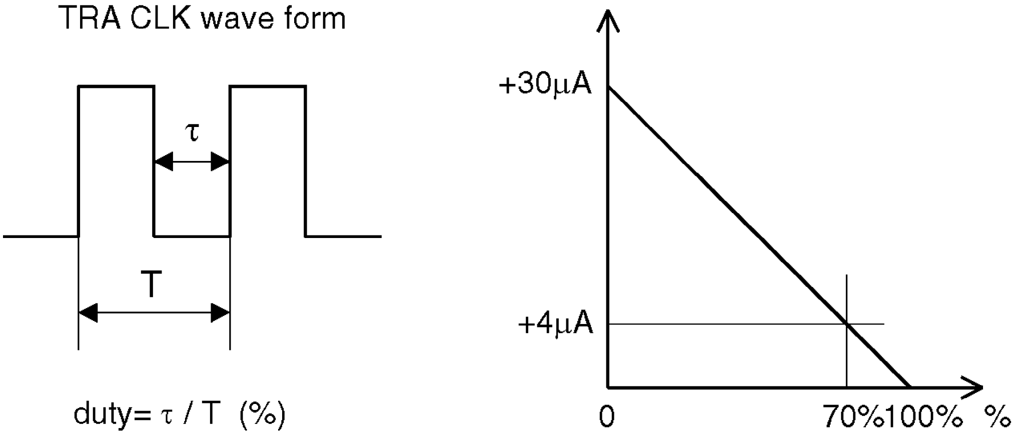
When the CHG REM terminal is "L" and the TRA CLK terminal is "Open", Transfer(-) BIAS(-1200V) is output from TRA OUTPUT the moment Charge BIAS(-1200V) is output from CHG OUTPUT. When 8KHz PWM (pulse-width modulation) signal is input to the TRA CLK terminal, Q101 turns ON by MC101, and TRA(+) CURRENT BIAS according to the PWM signal is output from TRA OUTPUT. The PWM signal will be turned to a constant voltage by the resistor and the condenser, and input to the MC101. The MC101 compares this voltage with the feedback voltage from T101 and controls the Q101. As for the transfer current, +30 μ A is output when DUTY of the TRA CLK input signal is 0%, or +4 μ A is output when that is 70%.

Circuit Diagram



INPUT 24V
MC101
CHG REM INPUT
TRA CLK INPUT
Transformer T101
Q101
TRA(+)output TRA(-)output
CHG output -1200V
Q202
T201 Transformer

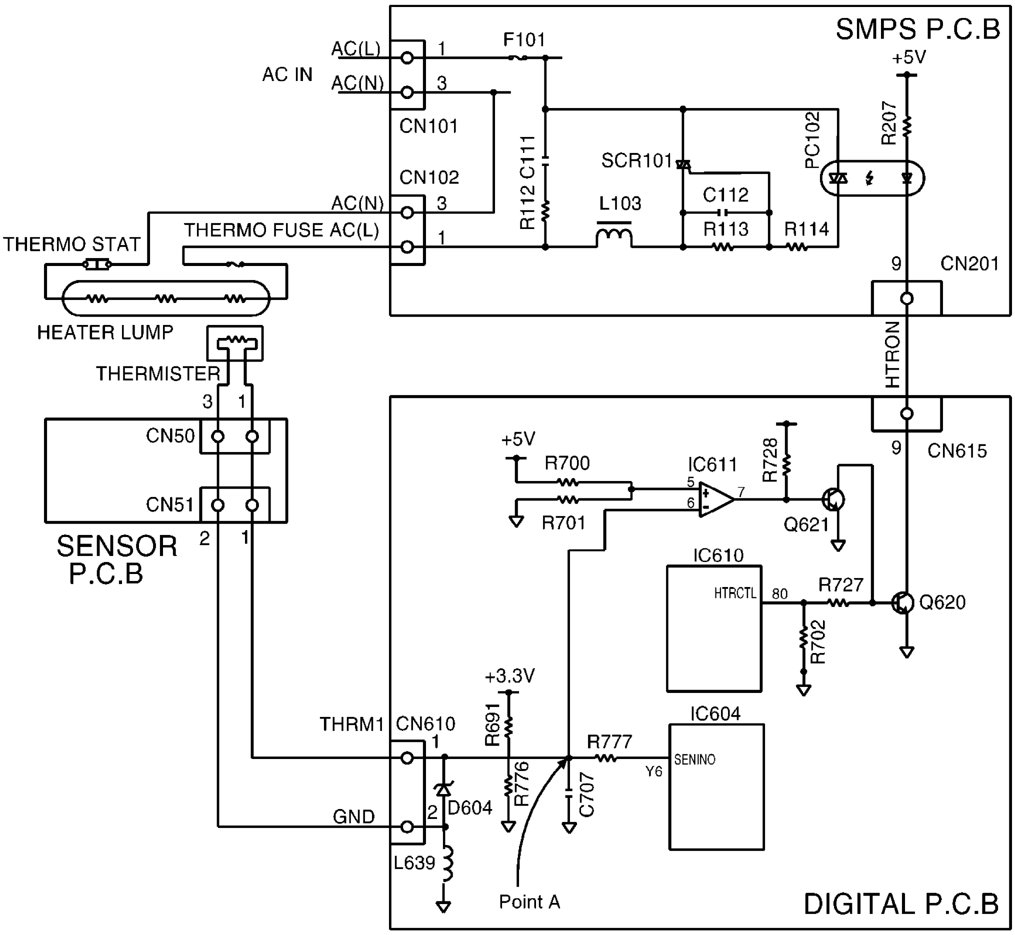
Transfer Current Variation by PWM Input



7.13. HEAT LAMP CONTROL CIRCUIT

The temperature of the fixing part of the Fixing Unit is converted to a voltage by THERMISTER and input to IC604-Y6 (analog input). The heater turns ON/OFF the photo-coupler PC101 at the heater control port (IC610-80pin), and is turned ON/OFF at the triac CR101. And a thermostat and a thermo fuse are set on the AC line as the safety devices.

Circuit Diagram

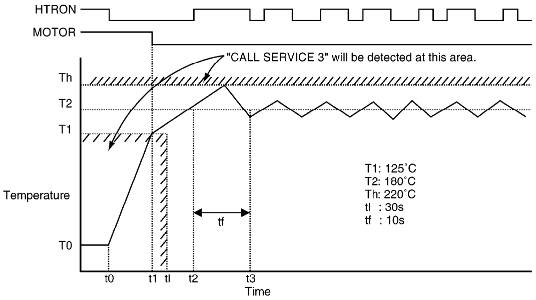

SMPS P.C.B
AC IN
AC(L)
AC(N)
1
3
CN101
F101
+5V
R207
PC102
R112 C111
SCR101
C112
L103
R113
R114
CN102
AC(N)
3
THERMO FUSE AC(L)
1
THERMO STAT
HEATER LUMP
9
CN201
HTRON
THERMISTER
3
1
CN50
CN51
SENSOR P.C.B
2
1
9
CN615
+5V
R700
R701
IC611
5
6
7
R728
Q621
IC610
HTRCTL
80
R727
Q620
R702
+3.3V
R691
THRM1
CN610
1
R776
R777
C707
IC604
SENINO
Y6
GND
2
D604
L639
Point A
DIGITAL P.C.B

1. Control at Printing

A. After the printing signal is received, turn ON the heater.

B. After that, turn ON the motor at the temperature T1 (about 125°C).

C. After that, control at the temperature T2 (about 180°C), and after the fixing stable time tf has passed, feed papers at the paper feeding permission time t3.



T0: Initial Temperature (At Power OFF / Normal Temperature) / T1: Primary Stable Temperature (Heater Disconnection / Thermistor

Loose Connection Detection Temperature) / T2: Secondary Stable Temperature (Paper Feeding Permission Temperature / Fixing Control Temperature)

T1: Primary Stable Temperature (Heater Disconnection / Thermistor Loose Connection Detection Temperature)
T2: Secondary Stable Temperature (Paper Feeding Permission Temperature / Fixing Control Temperature)
Th: Abnormal High Temperature
t0: Initial Time (After Printing Signal Received)
t1: Primary Stable Time
t2: Secondary Stable Time
t3: Paper Feeding Permission Time
tl: Abnormal Low Temperature Detection Time
tf: Fixing Stable Time

2. Safety Control by Software

A. Abnormal Low Temperature Detection (Heater Disconnection Detection / Thermistor Loose Connection Detection)

After the heater is ON, if the temperature of the fixing part does not reach T1 until tl, the heater will be OFF due to the abnormal low temperature detection (heater disconnection / thermistor loose connection).

B. Abnormal High Temperature Detection

If the thermistor detects the temperature Th, the heater will be OFF due to the abnormal high temperature detection.

3. Safety Control by Hardware

Considering the heater remains ON due to such as a program runaway or a thermistor breakdown, the following safety devices are prepared.

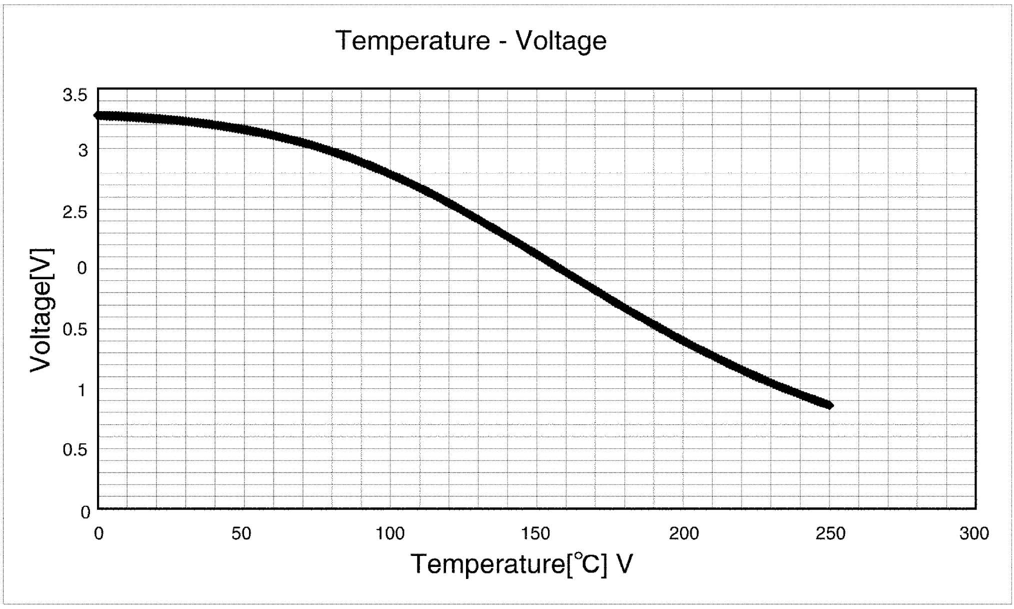
A. If the temperature detected by the thermistor exceeds 220°C, IC610-7pin becomes Low, and the heater is turned OFF forcibly.

B. If the temperature of the thermostat exceeds 135°C(*), the internal switch turns off to cut off the current to the heater, and the heater is turned off.

C. If the temperature of the thermo fuse exceeds 118°C(*), the internal switch turns off to cut off the current to the heater, and the heater is turned off.

*** Thermo stat and thermo fuse is apart from heat roller, so the detect temperature is low.**

Temperature [°C]	Register Value [K Ω]	Voltage [V]
125	**20.6**	**2.5**
180	**7.0**	**1.7**
225	**3.4**	**1.1**



The correspondence readings between temperature measured by thermistor and HEX readings

Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
0	**3F**	**84**	**3C**	**168**	**20**
1	**3F**	**85**	**3B**	**169**	**20**
2	**3F**	**86**	**3B**	**170**	**1F**
3	**3F**	**87**	**3B**	**171**	**1F**
4	**3F**	**88**	**3B**	**172**	**1F**
5	**3F**	**89**	**3A**	**173**	**1E**
6	**3F**	**90**	**3A**	**174**	**1E**
7	**3F**	**91**	**3A**	**175**	**1D**
8	**3F**	**92**	**3A**	**176**	**1D**
9	**3F**	**93**	**3A**	**177**	**1D**
10	**3F**	**94**	**39**	**178**	**1C**
11	**3F**	**95**	**39**	**179**	**1C**
12	**3F**	**96**	**39**	**180**	**1B**
13	**3F**	**97**	**39**	**181**	**1B**
14	**3F**	**98**	**38**	**182**	**1B**
15	**3F**	**99**	**38**	**183**	**1A**
16	**3F**	**100**	**38**	**184**	**1A**
17	**3F**	**101**	**38**	**185**	**1A**
18	**3F**	**102**	**37**	**186**	**19**
19	**3F**	**103**	**37**	**187**	**19**
20	**3F**	**104**	**37**	**188**	**18**
21	**3F**	**105**	**36**	**189**	**18**
22	**3F**	**106**	**36**	**190**	**18**
23	**3F**	**107**	**36**	**191**	**17**
24	**3F**	**108**	**36**	**192**	**17**
25	**3F**	**109**	**35**	**193**	**17**
26	**3F**	**110**	**35**	**194**	**16**
27	**3F**	**111**	**35**	**195**	**16**
28	**3F**	**112**	**34**	**196**	**15**
29	**3F**	**113**	**34**	**197**	**15**
30	**3F**	**114**	**34**	**198**	**15**
31	**3F**	**115**	**34**	**199**	**14**
32	**3F**	**116**	**33**	**200**	**14**
33	**3F**	**117**	**33**	**201**	**14**
34	**3F**	**118**	**33**	**202**	**13**
35	**3F**	**119**	**32**	**203**	**13**
36	**3F**	**120**	**32**	**204**	**13**
37	**3F**	**121**	**32**	**205**	**12**
38	**3F**	**122**	**31**	**206**	**12**
39	**3F**	**123**	**31**	**207**	**12**
40	**3F**	**124**	**31**	**208**	**11**
41	**3F**	**125**	**30**	**209**	**11**
42	**3F**	**126**	**30**	**210**	**11**
43	**3F**	**127**	**30**	**211**	**10**
44	**3F**	**128**	**2F**	**212**	**10**

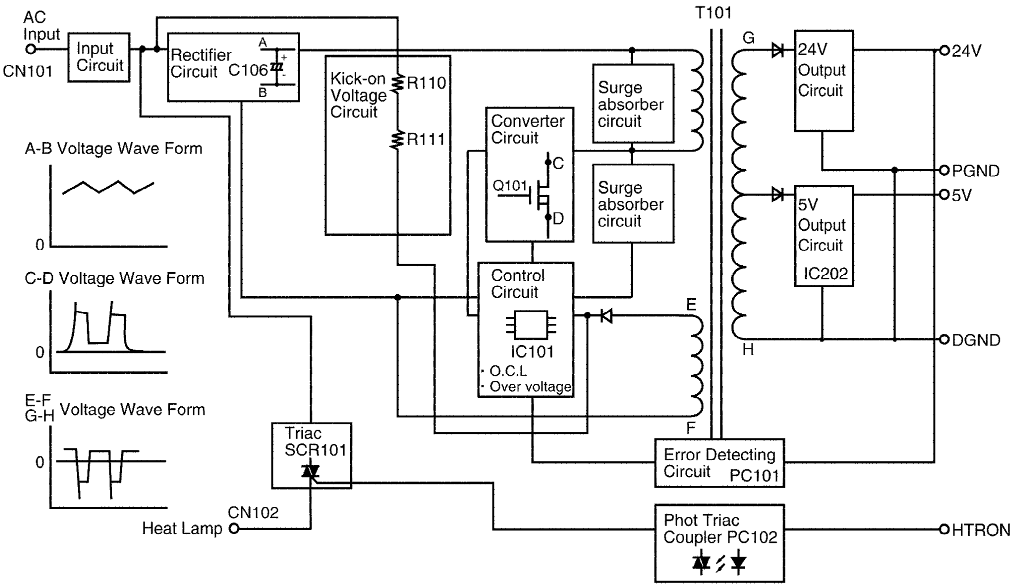
Temperature(°C)	HEX reading	Temperature(°C)	HEX reading	Temperature(°C)	HEX r
45	3F	129	2F	213	0F
46	3F	130	2F	214	0F
47	3F	131	2E	215	0F
48	3F	132	2E	216	0E
49	3F	133	2D	217	0E
50	3F	134	2D	218	0E
51	3F	135	2D	219	0E
52	3F	136	2C	220	0D
53	3F	137	2C	221	0D
54	3F	138	2C	222	0D
55	3F	139	2B	223	0C
56	3F	140	2B	224	0C
57	3F	141	2B	225	0C
58	3F	142	2A	226	0B
59	3F	143	2A	227	0B
60	3F	144	29	228	0B
61	3F	145	29	229	0A
62	3F	146	29	230	0A
63	3F	147	28	231	0A
64	3F	148	28	232	0A
65	3F	149	28	233	09
66	3F	150	27	234	09
67	3F	151	27	235	09
68	3E	152	26	236	08
69	3E	153	26	237	08
70	3E	154	26	238	08
71	3E	155	25	239	08
72	3E	156	25	240	07
73	3E	157	24	241	07
74	3D	158	24	242	07
75	3D	159	24	243	07
76	3D	160	23	244	06
77	3D	161	23	245	06
78	3D	162	22	246	06
79	3D	163	22	247	05
80	3C	164	22	248	05
81	3C	165	21	249	05
82	3C	166	21	250	20
83	3C	167	21		

Note:
The value is displayed on LCD at TEST FUNCTIONS () [#815].

7.14. POWER SUPPLY BOARD SECTION

This power supply board uses the switching regulator method.

Block Diagram



AC Input
CN101
Input Circuit
Rectifier Circuit
C106
A
B
Kick-on Voltage Circuit
R110
R111
Converter Circuit
Q101
C
D
Surge absorber circuit
Surge absorber circuit
Control Circuit
IC101
· O.C.L
· Over voltage
T101
G
H
E
F
24V Output Circuit
5V Output Circuit
IC202
24V
PGND
5V
DGND
A-B Voltage Wave Form
C-D Voltage Wave Form
E-F G-H Voltage Wave Form
0
Triac SCR101
CN102
Heat Lamp
Error Detecting Circuit PC101
Phot Triac Coupler PC102
HTRON

[Input Circuit]

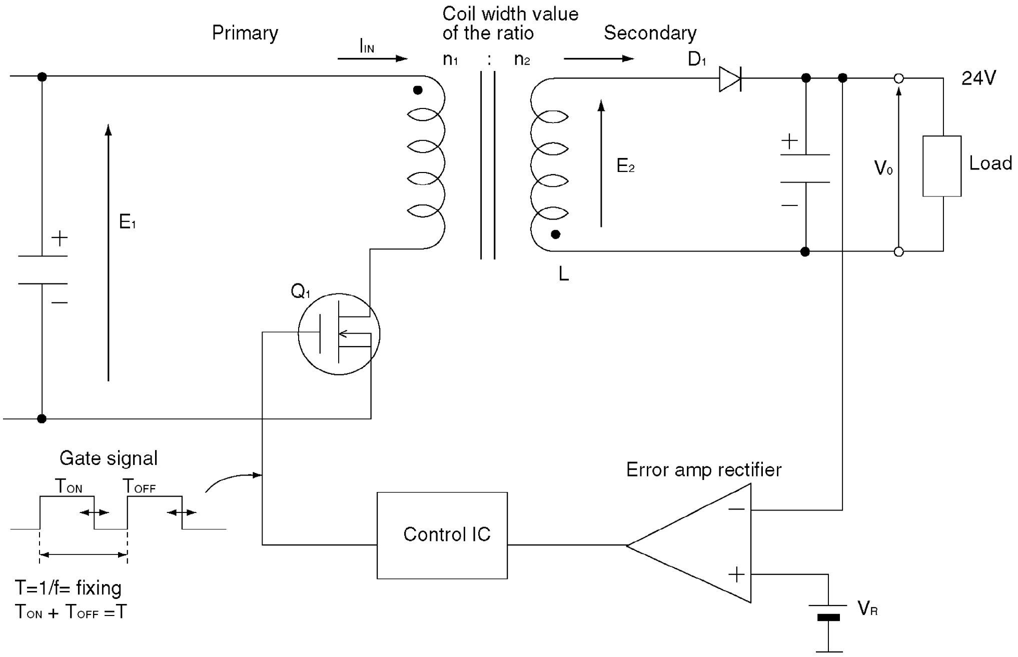
The input current goes into the input rectifier circuit through the filter circuit. The filter circuit decreases the noise voltage and the noise electric field strength.

[Rectifier Circuit]

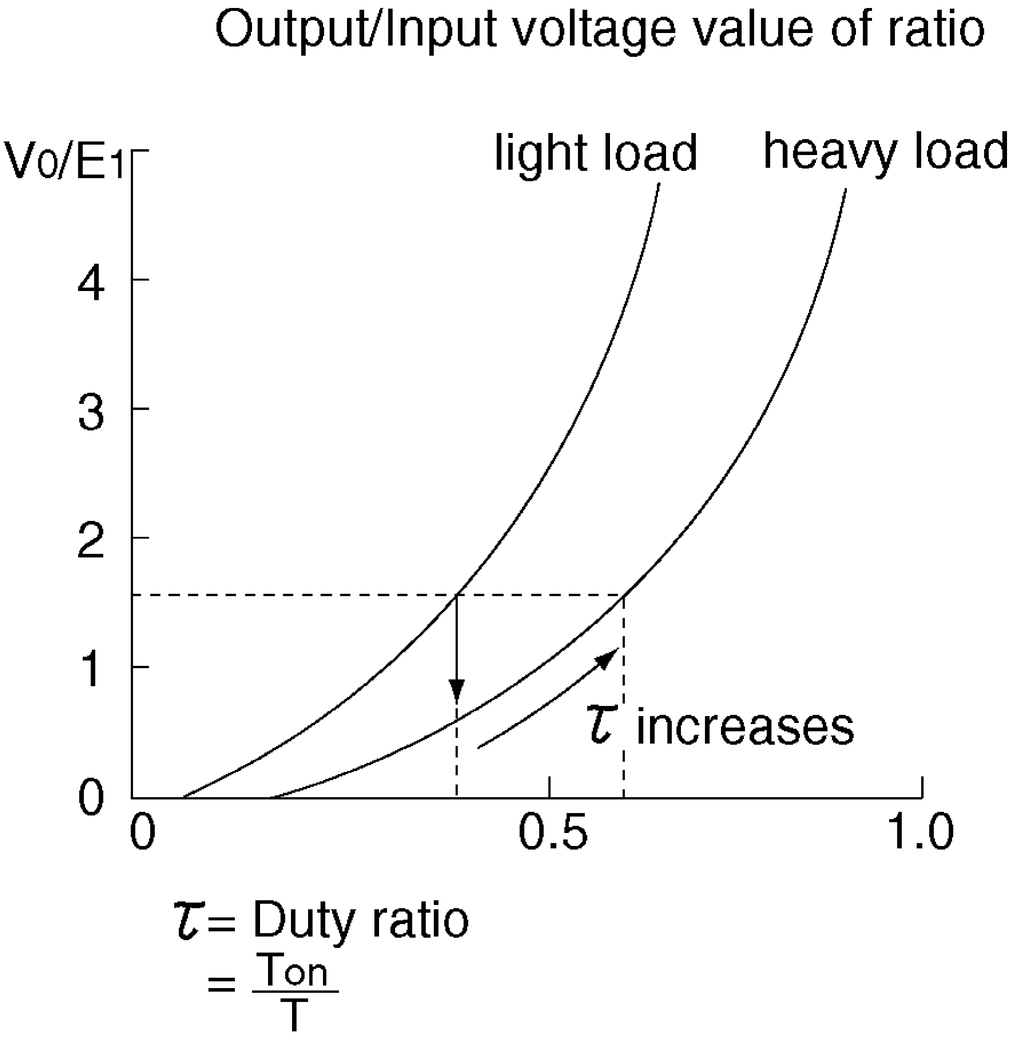
The input current is rectified by D101~ D104 and charges C106 to make DC voltage. Then it supplies power to the converter circuit.

[Kick-on voltage circuit]

Bias is applied to the Q101 gate via this circuit when the AC power is turned on and Q101 begins operating.


Primary
Coil width value
of the ratio
Secondary
I_{IN}
n_1 : n_2
D_1
24V
+
−
E_1
E_2
V_o
Load
L
Q_1
Gate signal
T_{ON}
T_{OFF}
T=1/f= fixing
T_{ON} + T_{OFF} =T
Control IC
Error amp rectifier
V_R

The following is an overview of how the power supply unit is controlled.
The control method of this power supply unit is pulse width modulation.
When Q_1 is ON, the energy is charged in the transfer primary coil according to E_1. When Q_1 is OFF, the energy is output from the secondary transfer as follows.
L → D_1 → Load → L
Then the power is supplied to the Load. When Q_1 is ON, power is not output from the secondary side. The output voltage is fed back in the control IC according to the error amp rectifier. Then depending on how T_{ON} is controlled, stabilization occurs. Also, when the current load becomes too large, in order to decrease the voltage output, the increase in τ is controlled and the output voltage is stabilized.
Therefore, basically the timing: Ton/Toff of Q1 controls the output voltage.



[Surge Absorber Circuit]
This circuit is for absorbing surge voltage generated by the transformer.

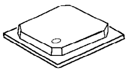
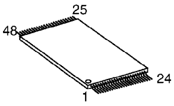
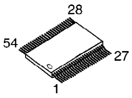
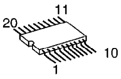
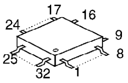
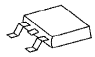
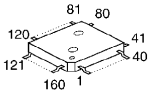
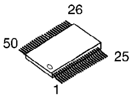
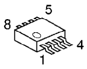
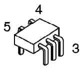
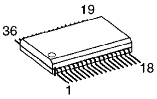
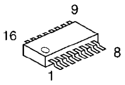
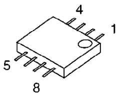
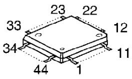
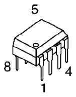
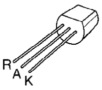
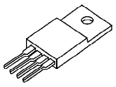
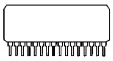
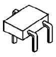
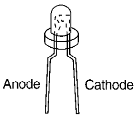
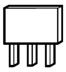
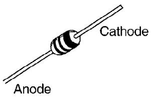
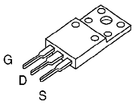
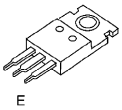
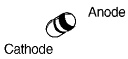
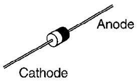
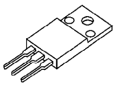
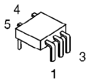
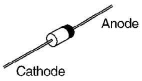
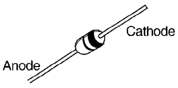
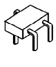
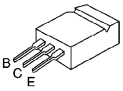
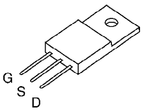
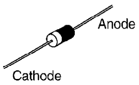
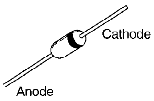
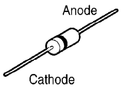
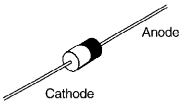
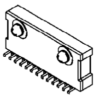
[Control Circuit and Detecting Circuit]
The control circuit amplifies the output with increased voltage detected in the error detecting circuit. Then it drives the main transistor.
In this power supply, the duty ratio is defined by changing the ON period of the main transistor. This is shown as follows.
When the output voltage of the 24V circuit increases, the current of the photo coupler PC101 increases, the pulse width of the output control IC becomes narrower and the ON period of Q101 becomes shorter.

[Over Current Limiter (O.C.L)]
The highest drain current (Q101) is limited by a limiter circuit (IC101) of 24V. The 24V output is limited by this circuit.

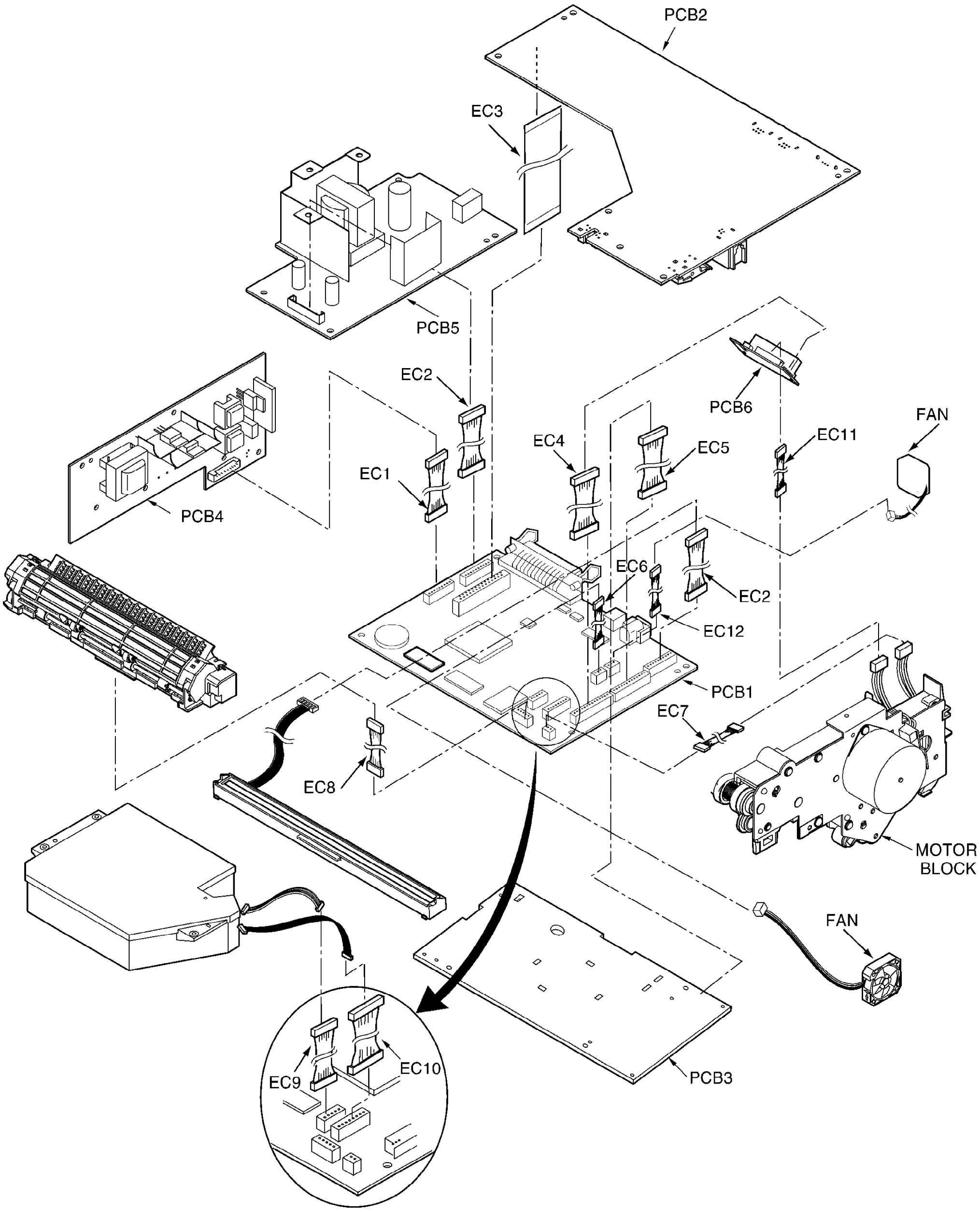
[Over Voltage Circuit]
If the 24V output increases because the error detecting circuit or control circuit is broken, IC101 will recognize this signal and output becomes 0V.

Dummy load method (to quickly check the power supply output)
Refer to POWER SUPPLY BOARD SECTION,] ().

8. TERMINAL GUIDE OF THE ICs TRANSISTORS AND DIODES

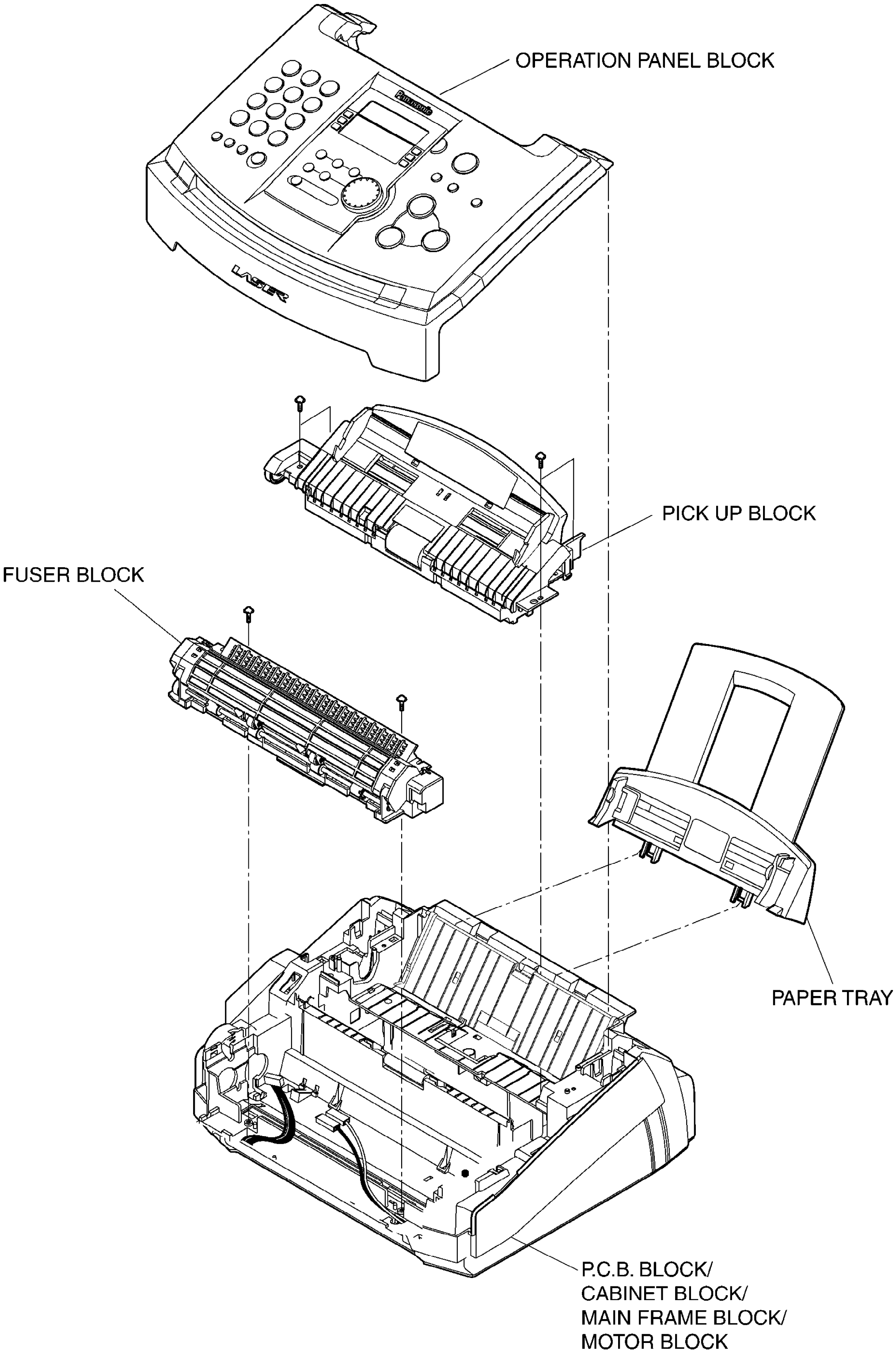
 C1CB00001402	 PFWIFLM551M	 C3ABPG000080	 PFVITVT245FT	 17 16 24 9 8 25 32 1 C1CB00001365
 PFVINSL1087D	 81 80 120 41 40 121 160 1 C1ZBZ0001924	 C3ABMG000039	 PQVINJM2903M	 C0JBAD000093 C0JBAC000265
 AN6384SB	 C1BB00000101	 PQVIMC34119D PFVINJM4558M	 23 22 33 12 34 11 44 1 MN7D032Z9J	 PFVIFA5317P
 AN1431T	 PFVIPQ05RD11	 MC41H13	 2SB1197K PQVTDTC143E 2SD1819A PQVINJM4558	 Anode Cathode PFVLRM505VRT
 2SD1921Q	 Cathode Anode MA4056	 2SK2662	 2SD1990P	PQVDNNCD56DT
 Anode Cathode PQVDRLS73T	 Anode Cathode PFVDAG01A PFVDD1NL20U PFVDAU02Z	 2SK2662 PFVDSF5LC20U	 PFVDNECD5R6G	 Anode Cathode PFVDLT1505 PFVDRK36LFB2
 Cathode Anode 1SS133 MA4220	 MA141WK,MA143 B0ZBZ0000048 PQVTDTC123JU	 2SD2137A	 2SA1413	 Anode Cathode PQVDS5688G PQVDDHM3M20
 Cathode Anode PQVDRD200EB PQVDRD6.2ESB	 Anode Cathode MA165	 Anode Cathode B0JAME000005	 PFVIMT200303	

9. FIXTURES AND TOOLS


PCB2
EC3
PCB5
EC2
PCB6
FAN
EC11
EC4
EC5
EC1
PCB4
EC6
EC2
EC12
PCB1
EC7
EC8
MOTOR
BLOCK
FAN
EC9
EC10
PCB3

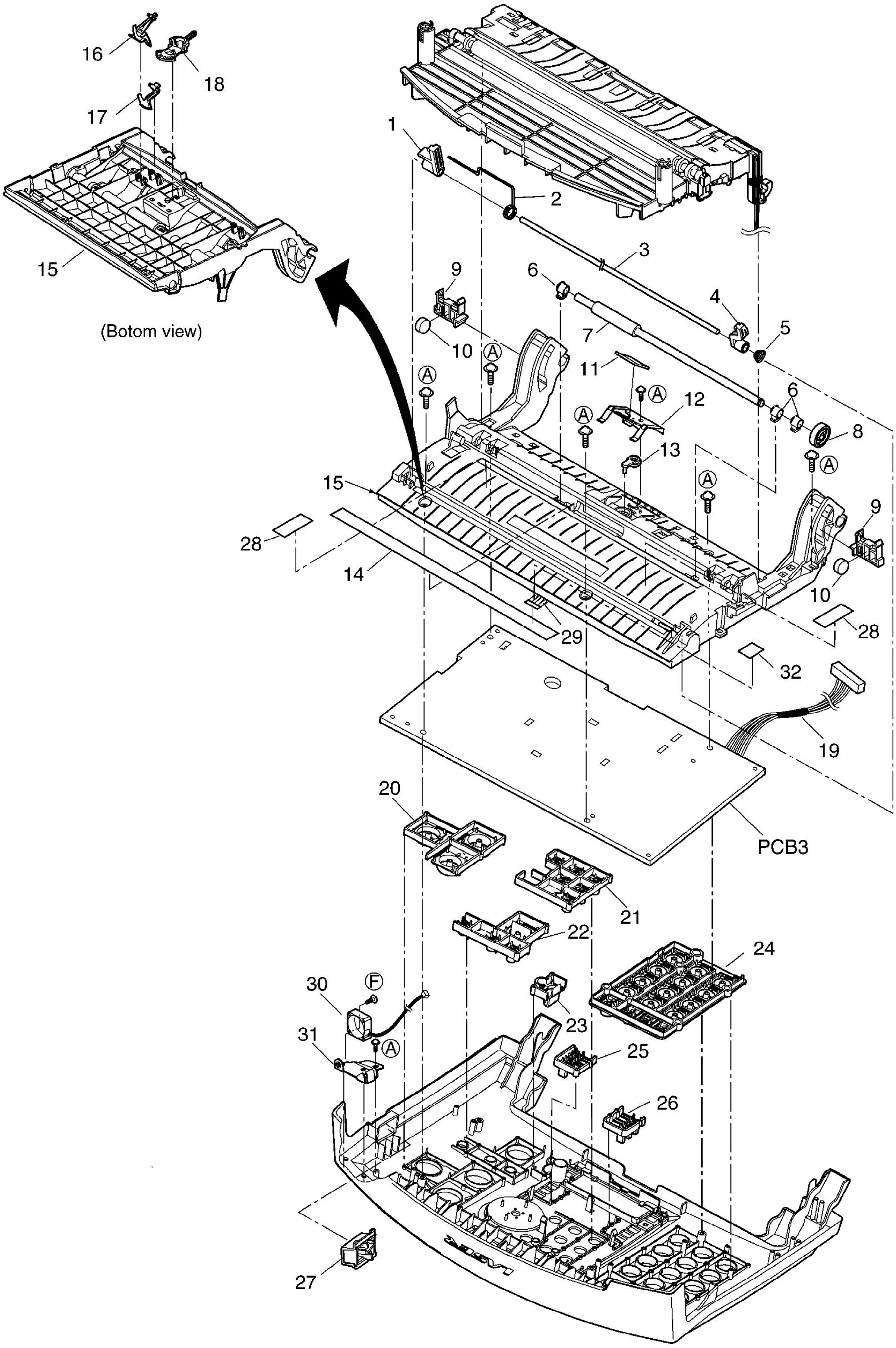
10. CABINET, MECHANICAL AND ELECTRICAL PARTS LOCATION

10.1. GENERAL SECTON

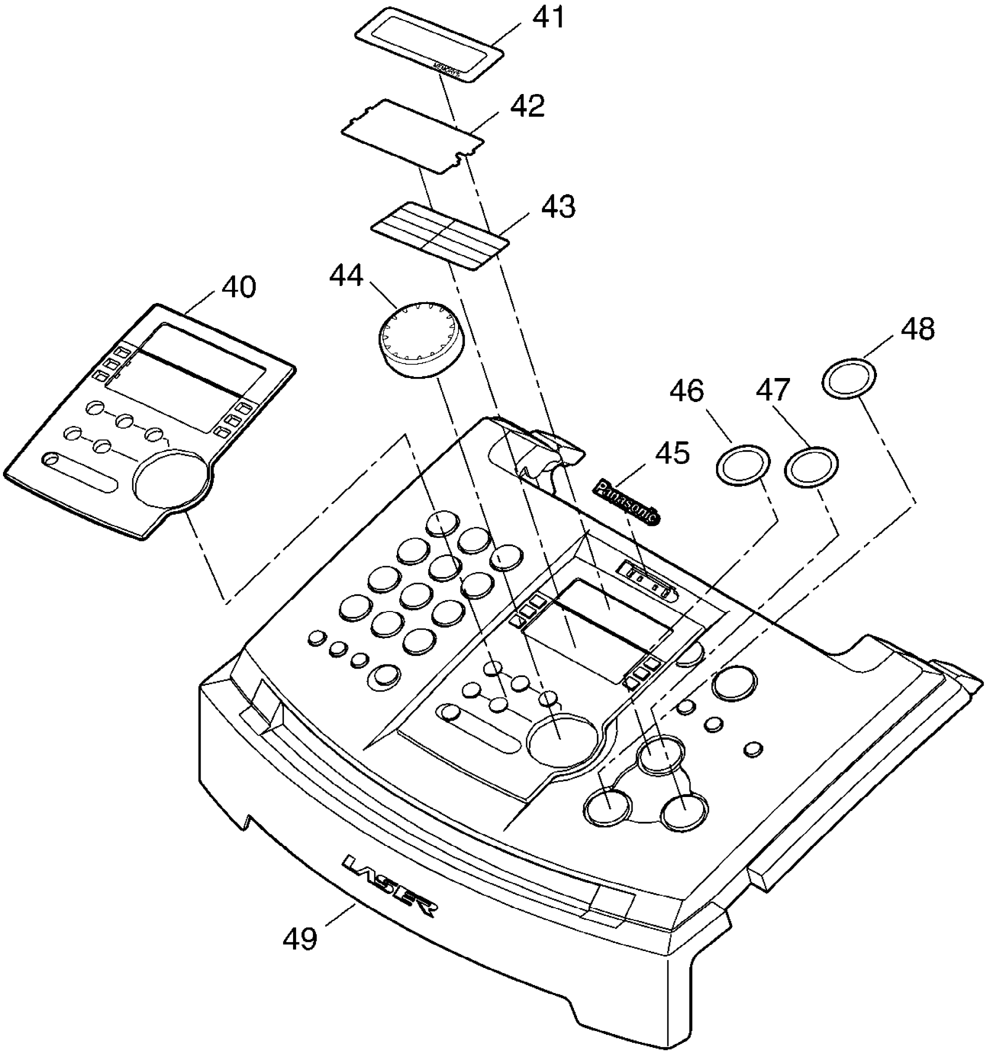

OPERATION PANEL BLOCK
PICK UP BLOCK
FUSER BLOCK
PAPER TRAY
P.C.B. BLOCK/
CABINET BLOCK/
MAIN FRAME BLOCK/
MOTOR BLOCK
Panasonic
LASER

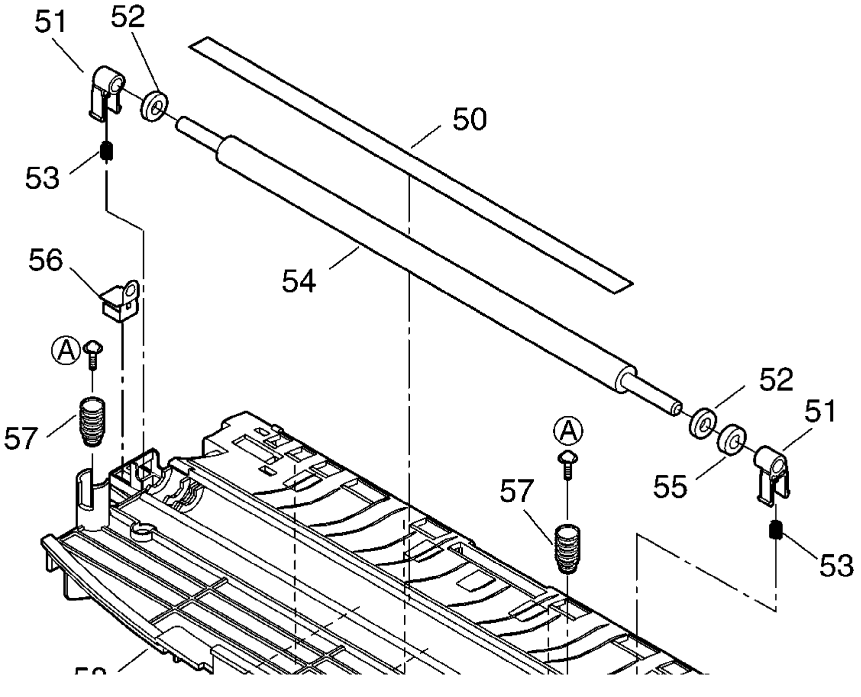
10.2. OPERATION PANEL SECTION

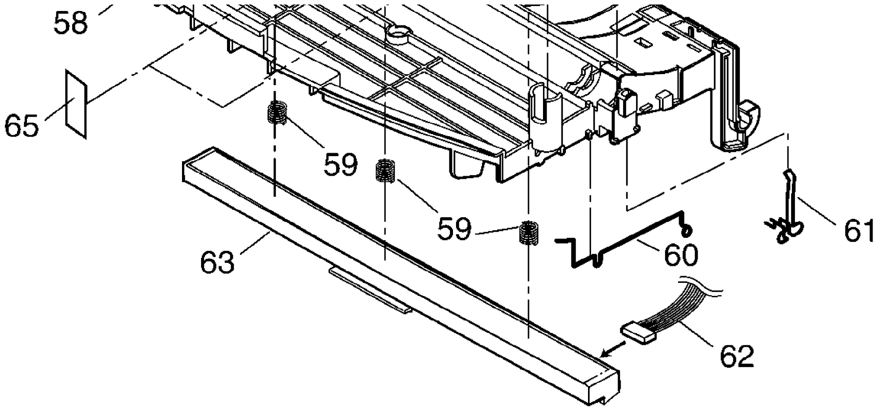
10.2.1. OPERATION PANEL BLOCK (1)


16
18
17
15
(Botom view)
1
2
3
9
6
4
5
7
10
Ⓐ
11
12
6
8
13
15
28
9
14
10
29
28
32
19
PCB3
20
21
22
24
30
Ⓕ
31
23
25
26
27

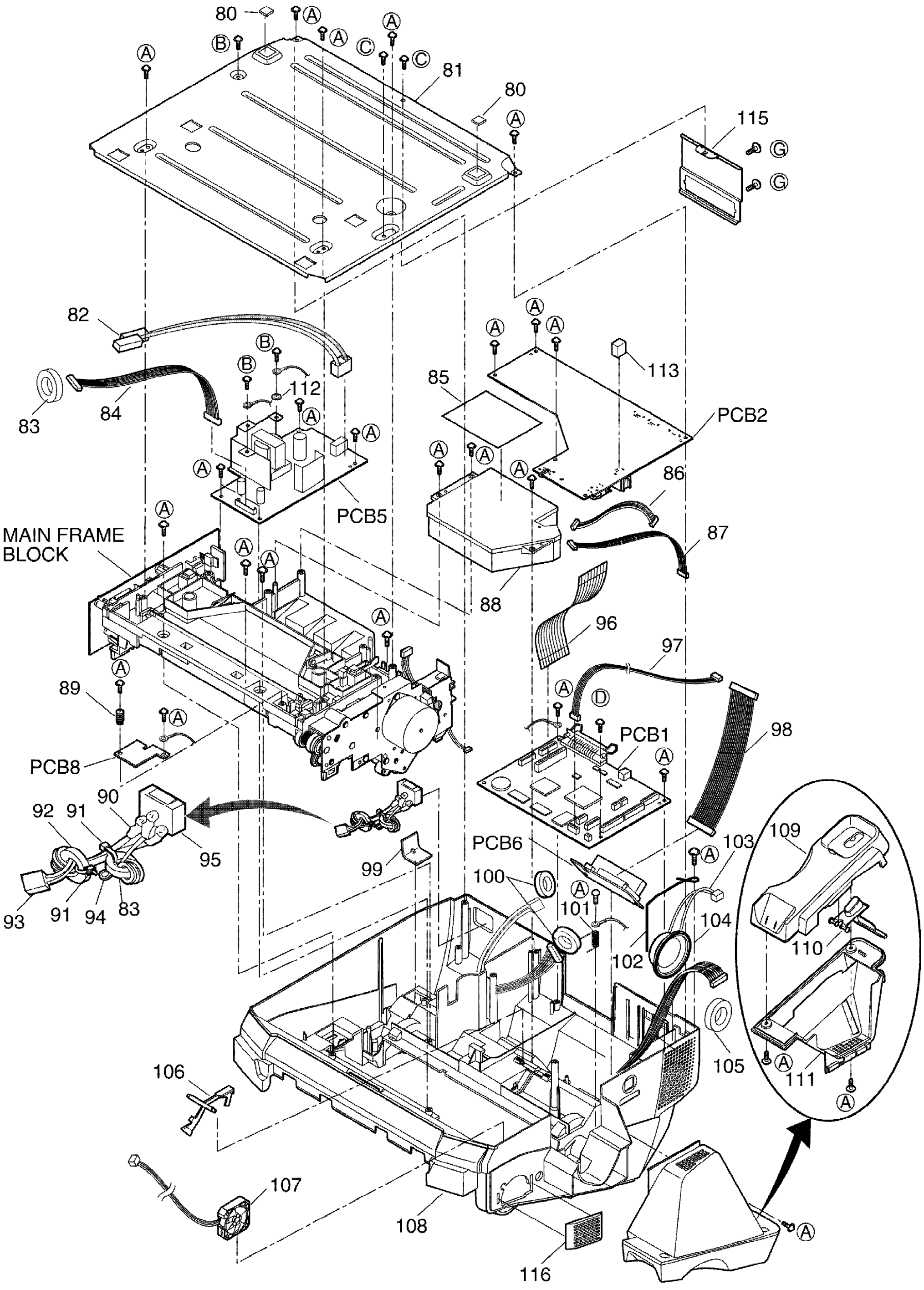
10.2.2. OPERATION PANEL BLOCK (2)


Panasonic
LASER

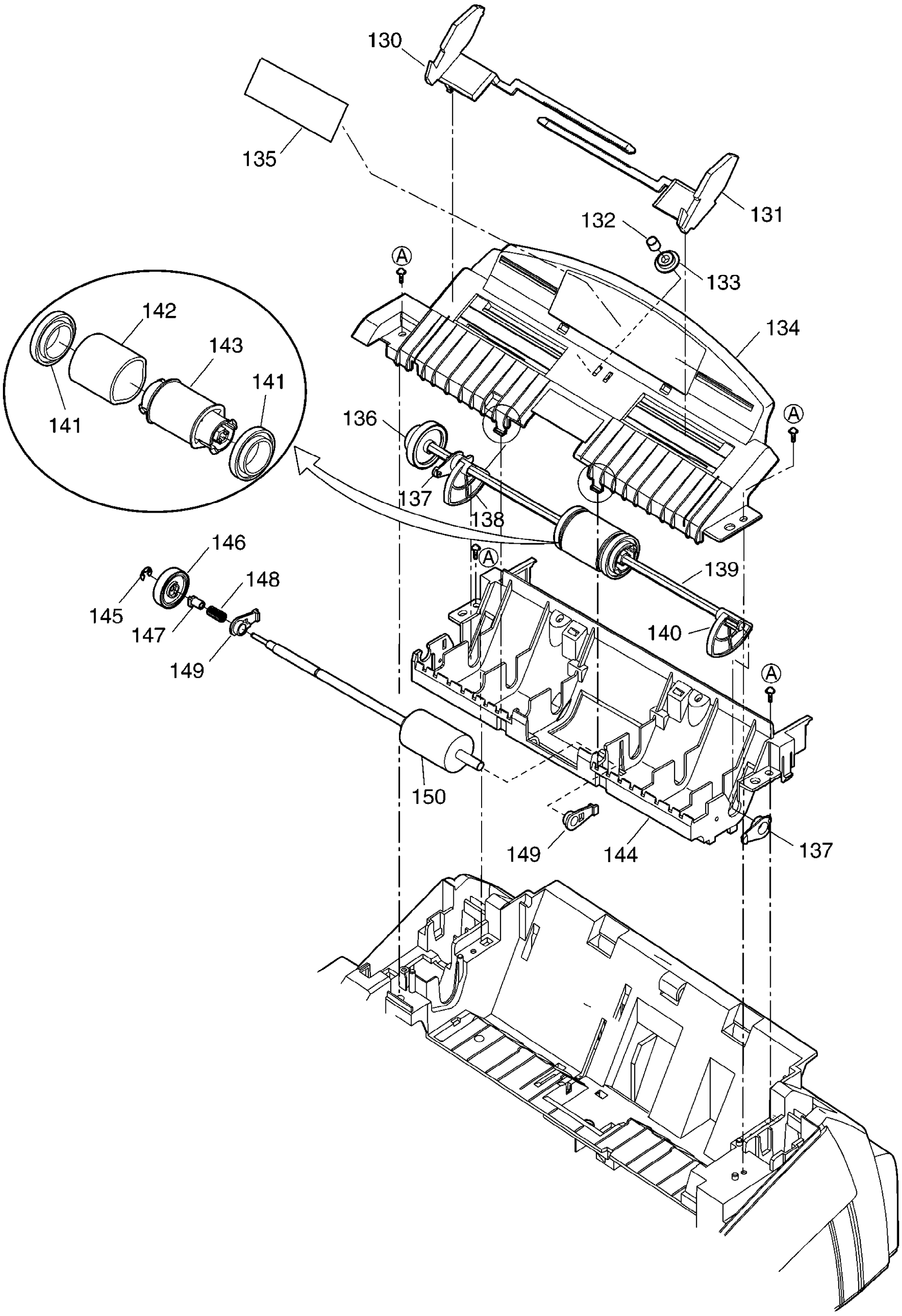

A
A


58
65
59
59
63
60
61
62

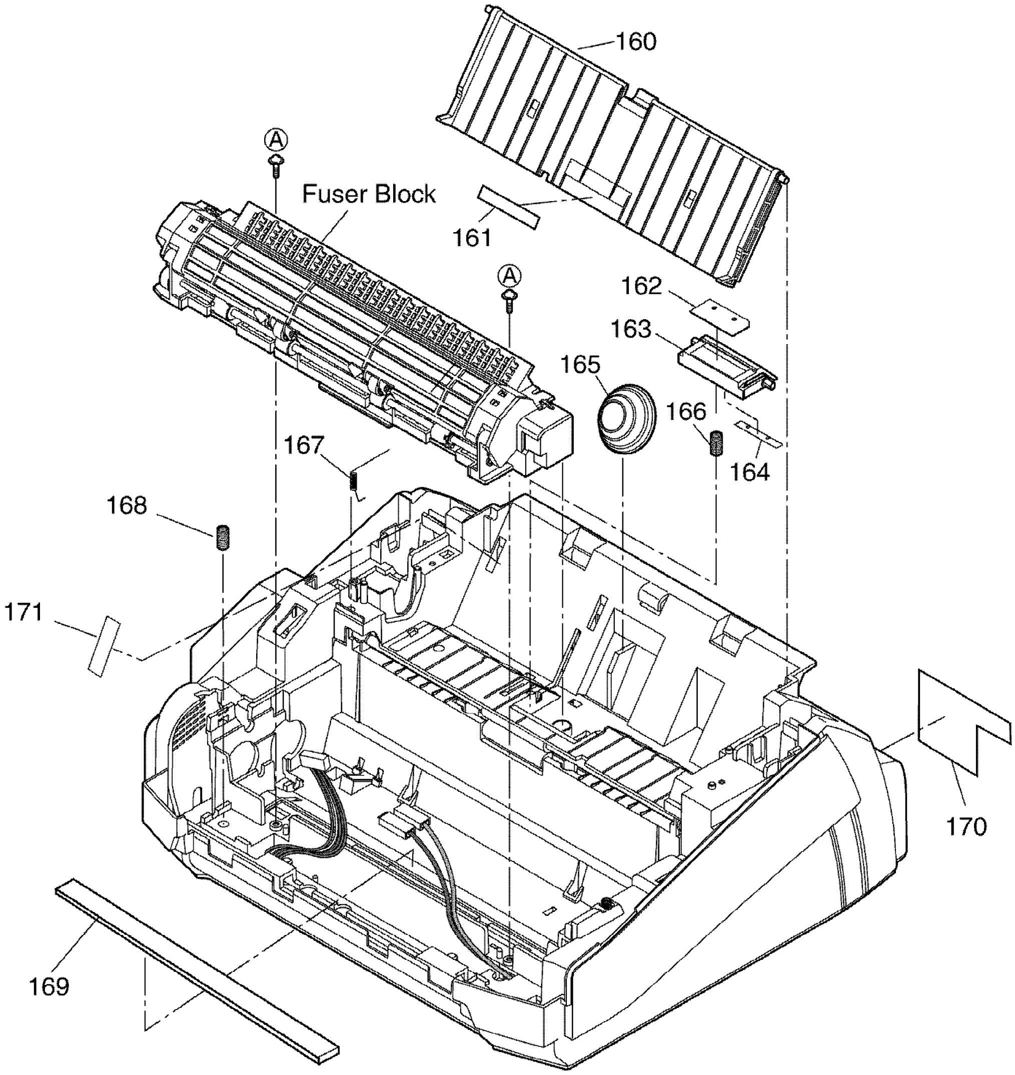
10.3. CABINET/P.C.B. BLOCK


80
Ⓐ
Ⓑ
Ⓐ
Ⓐ
Ⓒ
Ⓐ
Ⓒ
81
80
Ⓐ
115
Ⓖ
Ⓖ
82
Ⓑ
Ⓑ
112
83
84
Ⓐ
Ⓐ
Ⓐ
PCB5
85
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Ⓐ
Ⓐ
113
PCB2
86
MAIN FRAME
BLOCK
Ⓐ
Ⓐ
Ⓐ
Ⓐ
87
88
Ⓐ
96
97
Ⓐ
Ⓐ
Ⓓ
89
Ⓐ
PCB1
Ⓐ
98
PCB8
90
92
91
95
99
PCB6
100
Ⓐ
103
109
Ⓐ
101
104
110
102
93
91
94
83
105
Ⓐ
111
Ⓐ
106
107
108
Ⓐ
116

10.4. PICK UP BLOCK


130
135
131
132
133
134
Ⓐ
142
143
141
141
136
137
138
139
140
146
148
145
147
149
150
149
144
137

10.5. CABINET BLOCK


160
Ⓐ
Fuser Block
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Ⓐ
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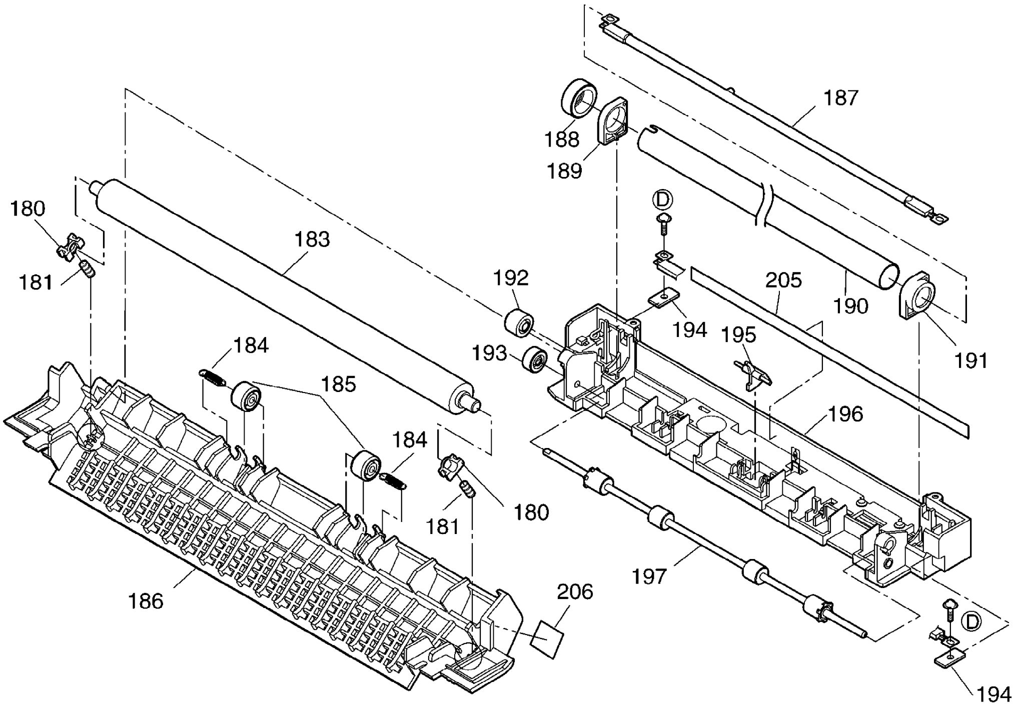
10.6. FUSER BLOCK

(Top view)



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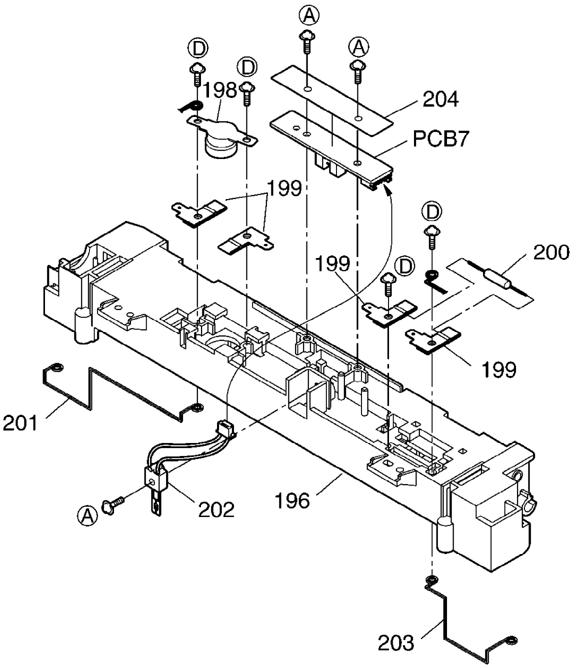
(Bottom view)



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Ⓐ
Ⓓ
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PCB7
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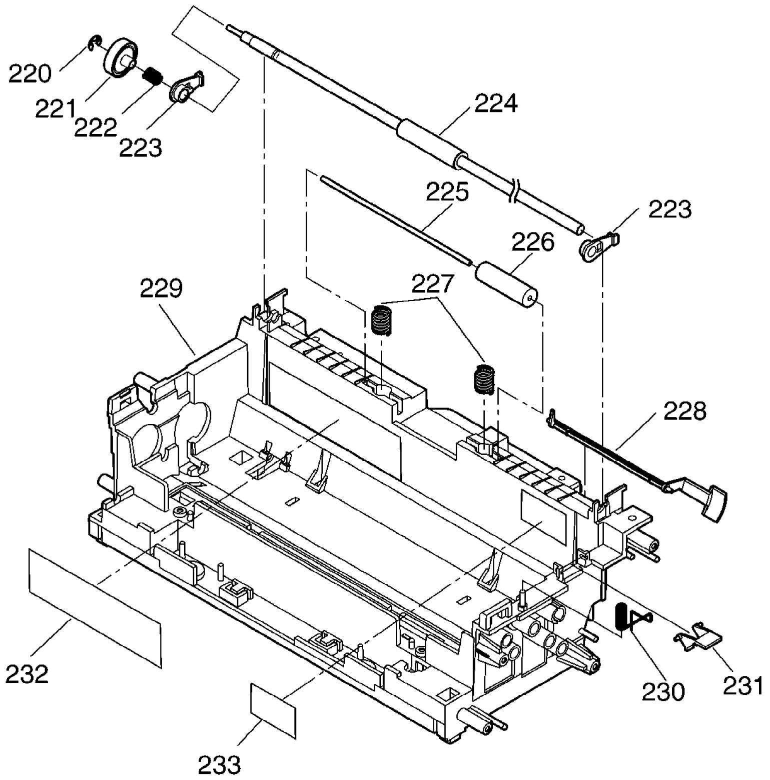
10.7. MAIN FRAME BLOCK

(Top view)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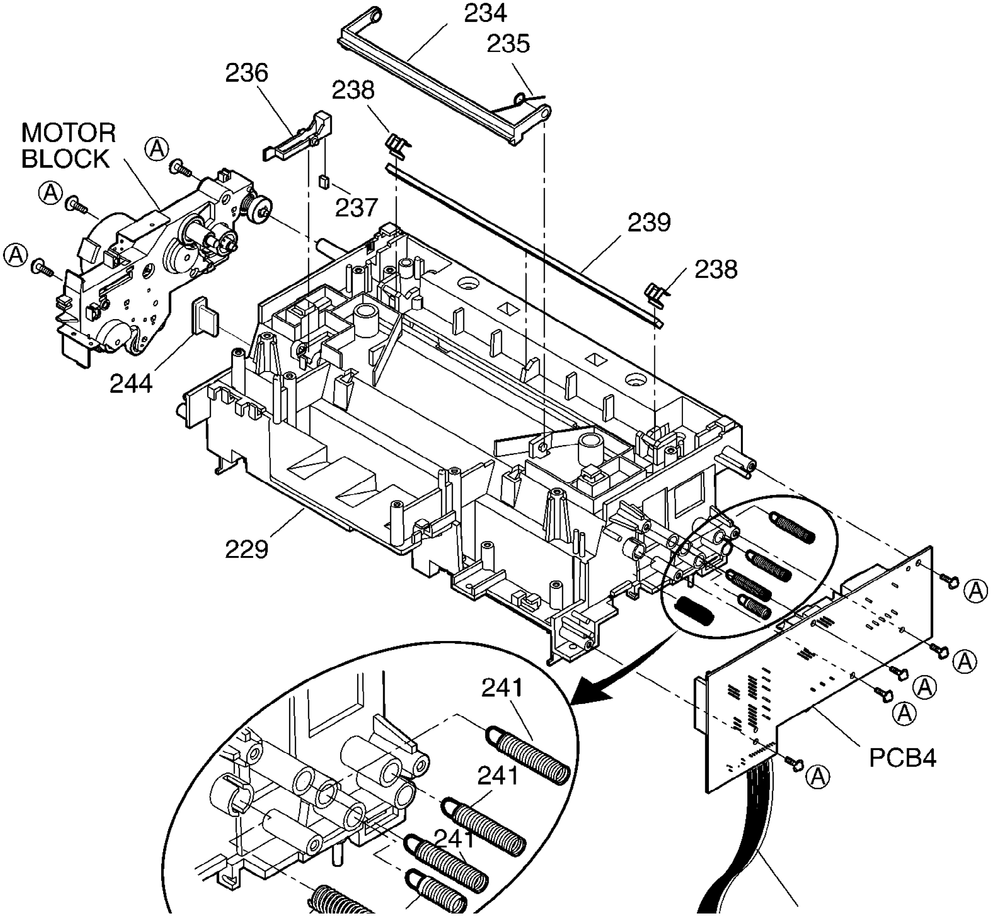
(Bottom view)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MOTOR BLOCK
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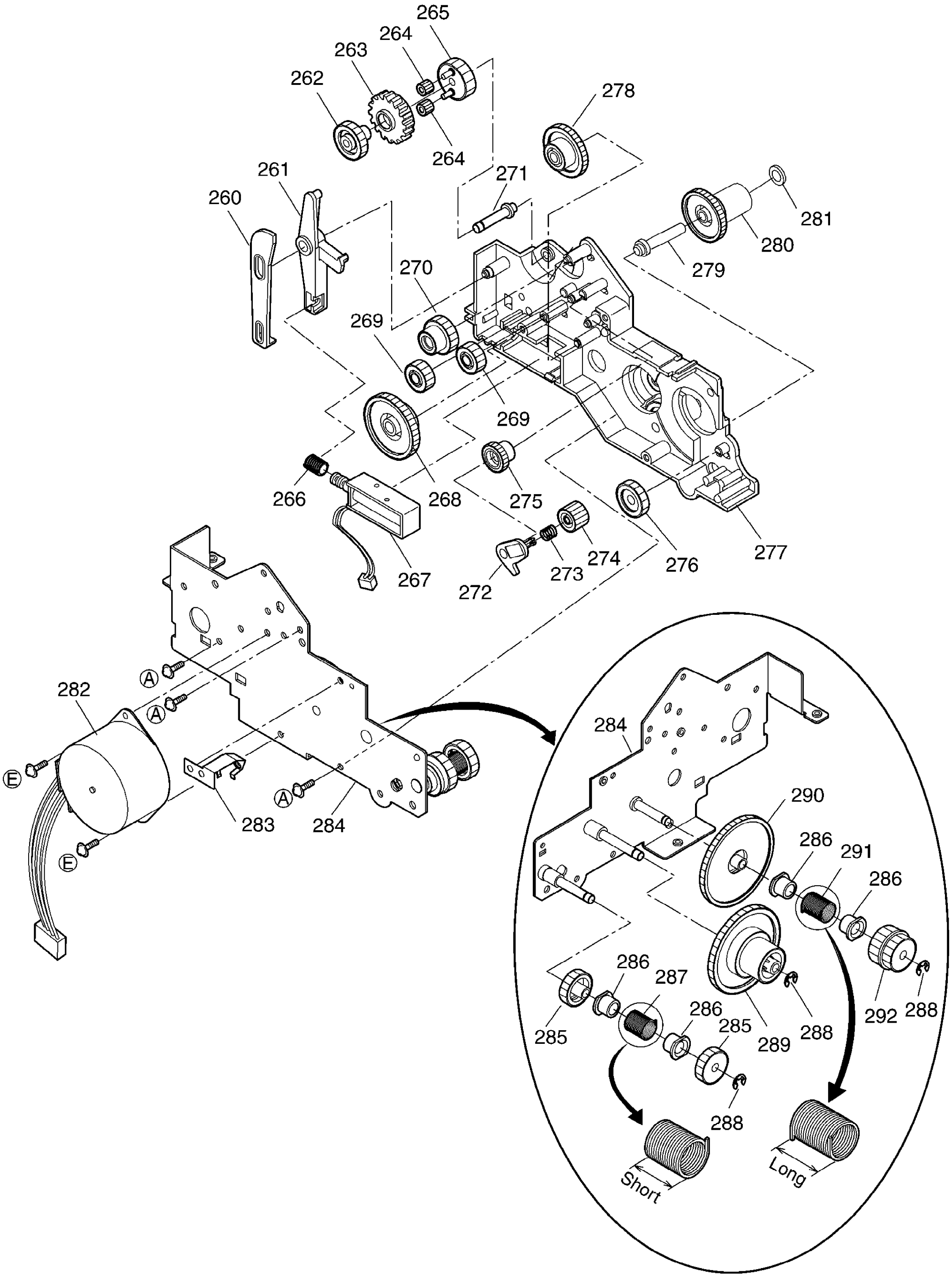
PCB4
Ⓐ

10.8. MOTOR BLOCK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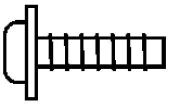
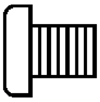
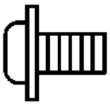
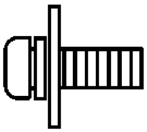
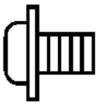
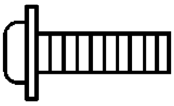
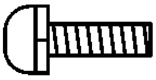
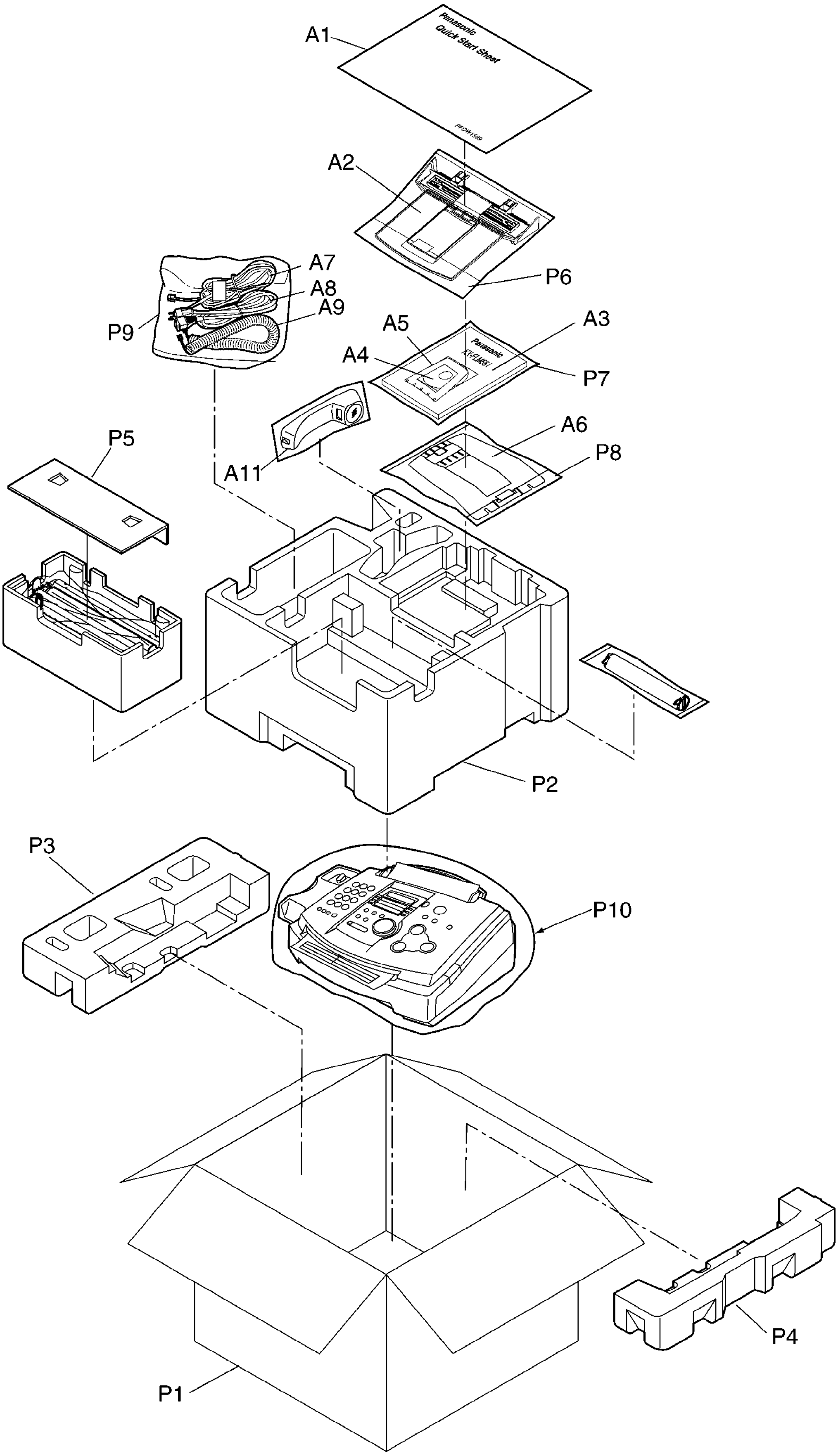
Short
Long

10.9. ACTUAL SIZE OF SCREWS AND WASHER

	Parts No.	Illustration
Ⓐ	XTW3+S10P	
Ⓑ	XSB4+6	
Ⓒ	XTW3+6L	
Ⓓ	XYC3+FF8C	
Ⓔ	XTW3+5LFZ	
Ⓕ	XTB3+14F	
Ⓖ	XSN3+6L	

11. ACCESSORIES AND PACKING MATERIALS


A1
Panasonic
Quick Start Sheet
PFQW1589
A2
P6
A7
A8
A9
P9
A5
A3
A4
Panasonic
KX-FLM551
P7
A6
P8
A11
P5
P2
P3
P10
P4
P1

12. REPLACEMENT PARTS LIST

Notes:

1. **The marking (RTL) indicates that the Retention Time is limited for this item.**
   After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retention period of availability is dependent on the type of assembly, and in accordance with the laws governing parts and product retention.
   After the end of this period, the assembly will no longer be available.
2. **Important safety notice**
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacture's specified parts.
3. **The S mark indicates service standard parts and may differ from production parts.**
4. **RESISTORS & CAPACITORS**
   Unless otherwise specified;
   All resistors are in ohms (Ω) k=1000 Ω , M=1000k Ω
   All capacitors are in MICRO FARADS (μ F) P= μ μ F
   ***Type & Wattage of Resistor**

Type

ERC:Solid	ERX:Metal Film	PQRD:Carbon
ERD:Carbon	ERG:Metal Oxide	PQRQ:Fuse
PQ4R:Chip	ERO:Metal Film	ERF:Wire Wound

Wattege

10,16,18:1/8W	14,25,S2:1/4W	12,50,S1:1/2W	1:1W	2:2W	5:5W

ECFD:Semi-Conductor	ECCD,ECKD,PQCBC,PQVP : Ceramic
ECQS:Styrol	ECQM,ECQV,ECQE,ECQU,ECQB : Polyester
PQCBX,ECUV:Chip	ECEA,ECSZ,ECOS : Electrolytic
ECMS:Mica	ECQP : Polypropylene

Voltage

ECQ Type	ECQG ECQV Type	ECSZ Type	Others	
1H : 50V	05 : 50V	0F : 3.15V	0J : 6.3V	1V : 35V
2A : 100V	1 : 100V	1A : 10V	1A : 10V	50,1H : 50V
2E : 250V	2 : 200V	1V : 35V	1C : 16V	1J : 63V
2H : 500V		0J : 6.3V	1E,25 : 25V	2A : 100V

12.1. CABINET AND ELECTRICAL PARTS

12.1.1. OPERATION PANEL BLOCK (1)

Ref. No.	Part No.	Part Name & Description	Remarks
1	PFDE1147X	LEVER, LOCK SHAFT L	
2	PFUS1324Z	SPRING, EARTH OPEN	
3	PFDF1061Z	SHAFT, LOCK LEVER	
4	PFDE1146Y	LEVER, LOCK SHAFT R	
5	PFUS1282Y	COIL SPRING	
6	PFDJ1007Z	SPACER	
7	PFDN1045X	ROLLER, DOCUMENT FEED	
8	PFDG1004Z	GEAR, DOCUMENT FEED ROLLER	
9	PFME1001Z	SPACER, DAMPER	
10	PFHG1094Z	RUBBER, DAMPER	
11	PFHG1104Y	RUBBER, SEPARATION	
12	PFUS1267Y	SPRING	
13	PFHR1224Z	LEVER, DOCUMENT SEPARATION	
14	PFHE1039Z	SPACER	
15	PFUV1034X	COVER, OPERATION PANEL	
16	PFDE1144X	LEVER, READ DETECTION	
17	PFDE1145Z	LEVER, DOCUMENT DETECTION	
18	PFHR1225Z	LEVER, LINK ADUST	
19	PFJS11P33Z	CONNECTOR	
20	PFBX1118Z1	BUTTON, START,STOP,COPY	
21	PFBX1117Z1	BUTTON, FUNCTION	
22	PFBX1119Z1	BUTTON, VOLUME	
23	PFBC1068Z1	BUTTON, AUTO ANSWER	
24	PFBX1116Y1	BUTTON, DIAL	
25	PFBX1121Z2	BUTTON, DIALER R	
26	PFBX1120Z2	BUTTON, DIALER L	
27	PFBC1067Z1	BUTTON, OPEN	
28	PFHX1445Y	SPACER, OPERATION PANEL COVER	
29	PFJV1001Y	SPACER, EARTH	
30	PFSF1001Y	FAN	
31	PFMH1115Z	PLATE,FAN	
32	PFHE1063Z	COVER	

12.1.2. OPERATION PANEL BLOCK (2)

Ref. No.	Part No.	Part Name & Description	Remarks
40	PFGG1065Z1	PANEL, SUB	
41	PFGP1176Z1	PANEL, LCD	
42	PFGV1010Z	COVER, TELEPHONE NO.	
43	PFGD1045Y	CARD, TELEPHONE NUMBER	
44	PFBE1007Z1	KNOB, JOG DIAL	
45	PFGB1001Z2	BADGE, PANASONIC	
46	PFHX1389Z	SPACER, COPY KEY	
47	PFHX1390Z	SPACER, FAX KEY	
48	PFHX1391Z	SPACER, STOP KEY	
49	PFGG1174Y1	PANEL, OPERATION	
50	PFHX1398Y	SPACER, TRANSFER ROLLER	
51	PFDJ1042Z	SPACER, TRANSFER ROLLER	
52	PFDJ1034Z	SPACER, TRANSFER ROLLER	
53	PFUS1269Y	SPRING, TRANSFER ROLLER	
54	PFDS1003Y	ROLLER, TRANSFER	
55	PFDG1211Z	GEAR, TRANSFER ROLLER	
56	PFMH1090Z	METAL PARTS, TRANSFER ROLLER	
57	PFUS1280Y	SPRING, POP UP	
58	PFUG1010V	GUIDE, MIDDLE	
59	PFUS1281Z	SPRING, CIS	
60	PFUS1283Z	SPRING	
61	PFUS1284Y	SPRING	
62	PFJS10P03Z	CONNECTOR	
63	PFWEFL501M	CIS UNIT	
64	Not Used		
65	PFHX1446Z	COVER, MIDDLE GUIDE	

12.1.3. CABINET/ P.C.B. BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
80	PFHA1001Z	RUBBER, LEG	
81	PFMD1048Z	FRAME, BOTTOM	
82	PFJS02P07Y	CONNECTOR	
83	PQLB1E1	INSULATOR	
84	PFJS10P11Z	CONNECTOR, 10PIN	
85	PFQT1719Z	INDICATION LABEL	
86	PFJS05P06Z	CONNECTOR, 5PIN	
87	PFJS08P05Z	CONNECTOR, 8PIN	
88	LPA1602K	LASER SCANNING UNIT	⚠
89	PFUS1320Z	SPRING	
90	PQMX10010Z	COVER	
91	PQHR945Z	BAND	
92	KR06TT251508	INSULATOR	
93	PFJS02P02Z	CONNECTOR, 2 PIN	
94	WLR18YK26CM4	CONNECTOR, 18 PIN	
95	PFJP03S04Z	CONNECTOR, 3 PIN	⚠
96	PFJE1021Z	LEAD WIRE	
97	PFJS05P04Z	CONNECTOR, 5 PIN	
98	PFJS14P09Z	CONNECTOR, 14PIN	
99	PFHX1432Z	SPACER	
100	PQLB1E1	INSULATOR	
101	PFUS1278Z	SPRING	
102	PFUS1268Z	SPRING	

Ref. No.	Part No.	Part Name & Description	Remarks
103	PFJS02P12Z	CONNECTOR, 2 PIN	
104	PFAS50P006Z	SPEAKER	
105	PQLB1E1	INSULATOR	
106	PFDE1149Y	LEVER	
107	PFSF1001X	FAN	
108	PFKM1065T1	CABINET BODY	
109	PFKM1066Z1	CABINET, HANDSET CRADLE	
110	PFBH1015Z1	BUTTON, HOOK	
111	PFKF1038Y1	CABINET, HANDSET CRADLE	
112	XWC4B	WASHER	
113	PFHG1119Z	RUBBER, SPACER	
114	Not used		
115	PFMH1108Z	PLATE, CONNECTOR	
116	PFKV1067Z1	COVER, FAN	

12.1.4. PICK UP BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
130	PFKR1018Z1	GUIDE, DOCUMENT L	
131	PFKR1019Z1	GUIDE, DOCUMENT R	
132	PFUS1222Z	SPRING, SLIDER	
133	PFDG1015Y	GEAR, SLIDER	
134	PFKE1019Z1	GUIDE, DOCUMENT	
135	PFQT1695Z	INDICATION LABEL	
136	PFDG1199Z	GEAR, PICK UP PAPER	
137	PFDJ1038Z	SPACER, PICK UP PAPER	
138	PFDG1212Y	CAM, L	
139	PFDF1060Z	SHAFT,PICK UP ROLLER	
140	PFDG1213Y	CAM, R	
141	PFDR1018Z	ROLLER, PIC UP GUIDE	
142	PFDN1048Z	ROLLER, PICK UP	
143	PFDE1150Z	GUIDE, PICK UP ROLLER	
144	PFUG1011Z1	GUIDE, PICK UP ROLLER	
145	XUC2FY	RETAINING RING	
146	PFDG1200X	GEAR, SEPARATION ROLLER	
147	PFDE1163Z	SPACER	
148	PQUS10038Z	SPRING, ONE WAY	
149	PFDJ1044Z	SPACER, FEED ROLLER	
150	PFDN1046Z	ROLLER, SEPARATION	

12.1.5. CABINET BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
160	PFKS1047Y1	TRAY	
161	PFHG1105Z	RUBBER PARTS	
162	PFHG1136Z	RUBBER PARTS	
163	PFHR1227W	COVER	
164	PFHX1468X	SPACER	
165	PFUS1276Y	SPRING	
166	PFUS1277Y	SPRING	
167	PFUS1279Y	SPRING	
168	PFUS1323Z	SPRING	
169	PF0G1004Z	GLASS	
170	PFGT1875Z_M	NAME PLATE, AL	
171	PFHX1545Z	COVER,SHEET	

12.1.6. FUSER BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
180	PFDJ1037Z	SPACER, PRESSURE ROLLER	
181	PFUS1263Z	SPRING, PRESSURE	
182	Not Used		
183	PFDS1005Z	ROLLER. PRESSURE	
184	PFUS1264Z	SPRING, EJECT	
185	PFDR1017Z	ROLLER, SUPORT EJECT	
186	PFUA1032Y	CHASSIS, FUSER	
187	PFAC1001Z	HEATER, 120 FUSER	⚠
188	PFDG1196Z	GEAR, HEAT ROLLER	
189	PFDJ1036Z	SPACER, HEAT ROLLER B	
190	PFDS1004Z	ROLLER, HEAT	
191	PFDJ1035Z	SPACER, HEAT ROLLER A	
192	PFDG1198Z	GEAR	
193	PFDG1197Z	GEAR, EJECT IDLER	
194	PFMH1085Z	METAL PARTS, HEATER BASE	
195	PFDE1142Y	LEVER, EXIT SENSOR	
196	PFUA1031X	CHASSIS, FUSER	
197	PFDR1016Z	ROLLER, EJECT	
198	PFTA1001Z	THERMOSTAT, FUSER	⚠
199	PFJT1014Y	TERMINAL, ROLLER	
200	PFAE001	FUSE, FUSER	⚠
201	PFJT1016Z	TERMINAL, WIRE B	
202	PFRT003	THERMISTOR, FUSER	
203	PFJT1015Z	TERMINAL, WIRE A	
204	PFHX1437Z	COVER, PROTECTION FUSER	
205	PFHX1442Y	COVER, PROTECTION FUSER	
206	PFQT1741Z	LABEL, HIGH TEMP WARNING	

12.1.7. MAIN FRAME BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
220	XUC2FY	RETAINING RING	
221	PFDG1201Z	GEAR, FEED ROLLER	
222	PFUS1325Z	SPRING, ONE WAY	
223	PFDJ1044Z	SPACER, FEED ROLLER	
224	PFDN1047Z	ROLLER, FEED PAPER	
225	PFDF1005Z	SHAFT, SUPPORT ROLLER	
226	PQDR9685Y	ROLLER, SUPPORT	
227	PFUS1275Z	SPRING, SHUTTER ROLLER	
228	PFDE1148Z	LEVER, PAPER TOP SENSOR	
229	PFUA1027X	FRAME	
230	PFUS1272Z	SPRING, TERMINAL	
231	PFUE1002Y	LEVER, COVER OPEN SW	
232	PFQT1851Z	LABEL, DRUM INSTALL	
233	PFQT1505Z	LABEL, LASER CAUTION	
234	PFUE1001Z	PLASTIC PARTS, SHUTTER	
235	PFUS1274Z	SPRING, SHUTTER	
236	PFUE1003W	LEVER	
237	PFMH1089Z	METAL PAERS, MIX ROLLER	
238	PFUS1028Z	SPRING, MIRROR LOCK	
239	PF0M1004Z	MIRROR	
240	PFJS09P08Z	CONNECTOR, 9 PIN	
241	PFUS1270Z	SPRING, TERMINAL	
242	PFUS1271Z	SPRING, TERMINAL	
243	PFUS1273Z	SPRING, TERMINAL	
244	PFHR1299ZZ	SPACER	

12.1.8. MOTOR BLOCK

Ref. No.	Part No.	Part Name & Description	Remarks
260	PFDE1143Z	LEVER, HOOK	
261	PFDE1139Y	LEVER, GEAR FIX	
262	PFDG1186Z	GEAR, PICK CLUCH	
263	PFDG1188Z	GEAR, PICK CLUCH	
264	PFDG1189Z	GEAR, PICK CLUCH PLANET	
265	PFDG1187Z	GEAR, PICK CLUCH	
266	PFUS1259Y	SPRING, SOLENOID	
267	PFFP1003Z	SOLENOID	
268	PFDG1176Z	GEAR, IDLER	
269	PFDG1177Z	GEAR, IDLER	
270	PFDG1178Z	GEAR, IDLER	
271	PFDF1056Z	SHAFT	
272	PFDE1138X	ARM, AWING	
273	PFUS1019Z	SPRING, THRUST	
274	PFDG1182Z	GEAR, PLANET	
275	PFDG1183Z	GEAR, SUN	
276	PFDG1190Y	GEAR, FUSER IDLER	
277	PFUA1028V	CHASSIS, GEAR A	
278	PFDG1175Z	GEAR, IDLER A	
279	PFDF1057Z	SHAFT	
280	PFDG1185Z	GEAR, DEVELOPER DRIVE	
281	PFNPD052080	WASHER, POLYSLIDER	
282	55SPM25D4NC	MOTOR	
283	PFUS1260Y	SPRING, OPC EARTH	

Ref. No.	Part No.	Part Name & Description	Remarks
284	PFUA1029Y	CHASSIS, GEAR B	
285	PFDG1181Y	GEAR, ONE WAY 2A	
286	PFDJ1031Y	SPACER, ONE WAY	
287	PFUS1262Z	SPRING, ONE WAY 2	
288	XUC4FY	RETAINING RING	
289	PFDG1184Z	GEAR, OPC DRIVE	
290	PFDG1179Z	GEAR, ONE WAY 1A	
291	PFUS1261Z	SPRING, ONE WAY 1	
292	PFDG1180Z	GEAR, ONE WAY 1B	

12.2. ACCESORIES AND PACKING MATERIALS

Ref. No.	Part No.	Part Name & Description	Remarks
A1	PFQW1589Z	QUICK START SHEET	
A2	PFZXFLM551M	TRAY, PAPER	
A3	PFQX1598Z	INSTRUCTION BOOK	
A4	PFJKFLM551Z	CD-ROM	
A5	PFKS1055Z	STACKER, DOCUMENT	
A6	PFZX1FL501M	STACKER, PAPER	
A7	PQJA10075Z	CORD, TEL.	⚠
A8	PFJA1030Z	CORD, POWER	⚠
A9	PFJA1029Z	CORD, CURL	
A10	Not Used		
A11	PFJXE0805Z	HANDSET	
P1	PFPE1209Z	CARTON BOX	
P2	PFPN1247Z	CUSHION, UPPER	
P3	PFPN1245Z	CUSHION, BOTTOM (L)	
P4	PFPN1246Z	CUSHION, BOTTOM (R)	
P5	PFPD1120Z	CUSHION, UPPER	
P6	XZB30X30A04	PROTECTION COVER	
P7	XZB32X45A04	PROTECTION COVER	
P8	XZB20X30A04	PROTECTION COVER	
P9	XZB20X35A04	PROTECTION COVER	
P10	PFPH1011Z	PACKING SHEET	

12.3. DIGITAL BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB1	PFWPFLM551M	DIGITAL BOARD ASS'Y	
		(ICs)	
IC601	PFVITVT245FT	IC	S
IC602	PFVITVT245FT	IC	S
IC603	C3ABMG000039	IC	
IC604	PFWPFLM551M	The part exchange of only IC1 is to do exchange with Ass'y of PCB1 because it is impossible.	
IC605	PFVINSL1087D	IC	S
IC606	PFWIFLM551M	IC	
IC608	C3ABPG000080	IC	
IC609	C1CB00001365	IC	
IC610	C1ZBZ0001924	IC	
IC611	PQVINJM2903M	IC	S
IC614	C0JBAC000265	IC	
IC615	C0JBAD000093	IC	
		(TRANSISTORS)	
Q603	2SB1197K	TRANSISTOR(SI)	S
Q604	2SB1197K	TRANSISTOR(SI)	S
Q607	PQVTDTC143E	TRANSISTOR(SI)	S
Q608	PQVTDTC143E	TRANSISTOR(SI)	S
Q609	PQVTDTC143E	TRANSISTOR(SI)	S
Q611	PQVTDTC143E	TRANSISTOR(SI)	S
Q612	2SB1197K	TRANSISTOR(SI)	S
Q613	PQVTDTC143E	TRANSISTOR(SI)	S
Q614	PQVTDTC143E	TRANSISTOR(SI)	S
Q615	2SB1197K	TRANSISTOR(SI)	S
Q616	PQVTDTC143E	TRANSISTOR(SI)	S
Q617	PQVTDTC143E	TRANSISTOR(SI)	S
Q618	PQVTDTC143E	TRANSISTOR(SI)	S
Q619	PQVTDTC143E	TRANSISTOR(SI)	S
Q620	2SD1819A	TRANSISTOR(SI)	S
Q621	2SD1819A	TRANSISTOR(SI)	S
Q622	PQVTDTC143E	TRANSISTOR(SI)	S
Q623	PQVTDTC143E	TRANSISTOR(SI)	S
Q624	PQVTDTC143E	TRANSISTOR(SI)	S
Q625	PQVTDTC143E	TRANSISTOR(SI)	S
Q626	PQVTDTC143E	TRANSISTOR(SI)	S
Q627	PQVTDTC143E	TRANSISTOR(SI)	S
Q630	2SB1197K	TRANSISTOR(SI)	S
		(DIODES)	
D601	PQVDNNCD56DT	DIODE(SI)	S
D602	MA141WK	DIODE(SI)	
D603	PQVDRLS73T	DIODE(SI)	S
D604	PQVDNNCD56DT	DIODE(SI)	S
D608	B0JAME000005	DIODE(SI)	
DA600	PFVDNECD5R6G	DIODE(SI)	
DA601	PFVDNECD5R6G	DIODE(SI)	
DA602	PFVDNECD5R6G	DIODE(SI)	
DA603	PFVDNECD5R6G	DIODE(SI)	
DA604	B0ZBZ0000048	DIODE(SI)	
		(BATTERY)	
BAT600	PFSU1004Z	LITHIUM BATTERY	S

Ref. No.	Part No.	Part Name & Description	Remarks
		(CONNECTORS)	
CN600	K1FB136B0031	CONNECTOR	
CN603	PQJP3G30Z	CONNECTOR, 3P	S
CN604	PFJP03A12Z	CONNECTOR, 3P	
CN605	K1KA14A00137	CONNECTOR	
CN607	K1KB04B00036	CONNECTOR	
CN608	PQJP10G30Y	CONNECTOR, 10P	S
CN609	PQJP02G100Z	CONNECTOR, 2P	
CN610	PQJP5G30Y	CONNECTOR, 5P	S
CN611	PQJP11G30Y	CONNECTOR, 11P	S
CN612	PQJP05G100Z	CONNECTOR, 5P	
CN614	PQJP9G30Y	CONNECTOR, 9P	S
CN615	PQJP10G30Y	CONNECTOR, 10P	S
CN616	PQJS28X59Z	CONNECTOR, 28P	
		(CAPACITORS)	
C601	ECEA0JK221	220	S
C604	ECEA0JK221	220	S
C605	ECUV1H102KBV	0.001	
C606	ECUV1H102KBV	0.001	
C607	ECUV1H102KBV	0.001	
C608	ECUV1H102KBV	0.001	
C609	ECUV1H102KBV	0.001	
C610	ECUV1H102KBV	0.001	
C611	ECUV1H102KBV	0.001	
C612	ECUV1H102KBV	0.001	
C613	ECUV1H102KBV	0.001	
C614	ECUV1H102KBV	0.001	
C615	ECUV1H102KBV	0.001	
C616	ECUV1H102KBV	0.001	
C617	ECUV1H102KBV	0.001	
C618	ECUV1H102KBV	0.001	
C619	ECUV1H102KBV	0.001	
C620	ECUV1H102KBV	0.001	
C621	ECUV1H102KBV	0.001	
C622	ECUV1H102KBV	0.001	
C623	ECUV1H102KBV	0.001	
C624	ECUV1C104ZFV	0.1	
C625	ECUV1C104ZFV	0.1	
C626	ECEA1HU100	10	S
C627	ECUV1E104ZFV	0.1	S
C634	ECUV1C104ZFV	0.1	
C635	ECUV1H270JCV	27p	
C636	ECUV1C104ZFV	0.1	
C637	ECUV1C104ZFV	0.1	
C638	ECUV1C104ZFV	0.1	
C639	ECUV1C334ZFV	0.33	
C640	ECUV1H102KBV	0.001	
C642	ECUV1A105ZFV	1	
C643	ECUV1C334ZFV	0.33	
C647	ECUV1H270JCV	27p	
C648	ECUV1C104ZFV	0.1	
C649	ECUV1C104ZFV	0.1	
C650	ECUV1H270JCV	27p	
C652	ECUV1C104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C653	ECEA0JK221	220	S
C654	ECUV1H101JCV	100p	
C655	ECUV1C104KBV	0.1	
C656	ECUV1C334ZFV	0.33	
C657	ECUV1C104KBV	0.1	
C658	ECUV1C104KBV	0.1	
C659	ECUV1C104KBV	0.1	
C660	ECUV1C104ZFV	0.1	
C661	ECUV1C104ZFV	0.1	
C662	ECUV1C104ZFV	0.1	
C663	ECEA0JKS101	100	S
C664	ECUV1H150JCV	15p	
C665	ECUV1H220JCV	22p	
C666	ECUV1C104ZFV	0.1	
C667	ECUV1H220JCV	22p	
C671	ECUV1C104ZFV	0.1	
C672	ECUV1H270JCV	27p	
C673	ECUV1C104ZFV	0.1	
C674	ECUV1C104ZFV	0.1	
C675	ECUV1C104ZFV	0.1	
C676	ECUV1C104ZFV	0.1	
C678	ECUV1H180JCV	18p	
C681	ECUV1H150JCV	15p	
C682	ECUV1H150JCV	15p	
C684	ECUV1H150JCV	15p	
C685	ECUV1H150JCV	15p	
C686	ECUV1H150JCV	15p	
C687	ECUV1H270JCV	27p	
C688	ECUV1C104ZFV	0.1	
C689	ECUV1C104ZFV	0.1	
C690	ECUV1H270JCV	27p	
C691	ECUV1C334ZFV	0.33	
C692	ECUV1C104ZFV	0.1	
C693	ECUV1H331JCV	330p	S
C694	ECUV1C104ZFV	0.1	
C695	ECUV1C104ZFV	0.1	
C698	ECUV1C104ZFV	0.1	
C699	ECUV1C104ZFV	0.1	
C700	ECUV1C104ZFV	0.1	
C701	ECUV1C104ZFV	0.1	
C702	ECEA1HU100	10	S
C703	ECEA1HU100	10	S
C704	ECUV1C104ZFV	0.1	
C705	ECUV1C104ZFV	0.1	
C707	ECUV1C104ZFV	0.1	
C708	ECUV1H102KBV	0.001	
C709	ECUV1C104ZFV	0.1	
C710	ECUV1C104ZFV	0.1	
C711	ECEA1HU100	10	S
C712	ECUV1C104ZFV	0.1	
C713	ECEA1HU100	10	S
C714	ECUV1C104ZFV	0.1	
C715	ECUV1C104ZFV	0.1	
C716	ECUV1C104ZFV	0.1	

Ref. No.	Part No.	Part Name & Description	Remarks
C717	ECUV1C104ZFV	0.1	
C718	ECUV1C104ZFV	0.1	
C719	ECUV1C104ZFV	0.1	
C720	ECUV1C104ZFV	0.1	
C721	ECUV1H103KBV	0.01	
C722	ECUV1H102KBV	0.001	
C723	ECUV1A224KBV	0.22	
C736	ECUV1H102KBV	0.001	
C737	ECUV1H102KBV	0.001	
C738	ECUV1C104ZFV	0.1	
C739	ECUV1C104ZFV	0.1	
C740	ECUV1C104ZFV	0.1	
C741	ECUV1H103KBV	0.01	
C742	ECUV1H102KBV	0.001	
C743	ECUV1H102KBV	0.001	
C744	ECUV1H821KBV	820p	
C745	ECEA1AU101	100	S
C747	ECUV1C104ZFV	0.1	
C750	ECUV1C104ZFV	0.1	
C751	ECUV1C104ZFV	0.1	
C752	ECEA1VKA101	100	S
C753	ECEA1AU101	100	S
C754	ECUV1C104ZFV	0.1	
C755	ECUV1E104ZFV	0.1	S
C756	ECUV1E104ZFV	0.1	S
C757	ECEA1VKA101	100	S
C758	ECUV1C104ZFV	0.1	
C759	ECUV1C104ZFV	0.1	
C760	ECUV1C104ZFV	0.1	
C761	ECUV1C104ZFV	0.1	
C762	ECUV1A105ZFV	1	
C763	ECUV1C104ZFV	0.1	
C764	ECUV1H101JCV	100p	
C765	ECUV1H101JCV	100p	
C766	ECUV1H101JCV	100p	
C767	ECUV1H101JCV	100p	
C768	ECUV1H101JCV	100p	
C769	ECUV1H180JCV	18p	
C772	ECUV1C104ZFV	0.1	
		(FUSES)	
F604	PFRB0031063	FUSE RESISTOR	
F605	PFRB0031200	FUSE RESISTOR	S
		(COILS)	
L621	PQLQR2BT	COIL	S
L628	PQLQR2BT	COIL	S
L632	PQLQR2BT	COIL	S
L638	PQLQR1ET	COIL	S
L649	PQLQR2BT	COIL	S
L669	PQLQR2BT	COIL	S
L670	PQLQR2BT	COIL	S
L671	PQLQR2BT	COIL	S
L672	PQLQR2BT	COIL	S
R667	PQLQR2BT	COIL	S
R762	PQLQR2BT	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
R790	PQLQR2BT	COIL	S
		(COMPONENTS COMBINATION)	
L643	EXCELDR35	COMPONENTS PARTS	
L644	EXCELDR35	COMPONENTS PARTS	
RA605	PFXBV8V470JV	RESISTOR ARRAY	S
RA606	PFXBV8V470JV	RESISTOR ARRAY	S
RA607	PFXBV8V470JV	RESISTOR ARRAY	S
RA608	PFXBV8V470JV	RESISTOR ARRAY	S
RA618	PFXBV8V470JV	RESISTOR ARRAY	S
RA619	PFXBV8V470JV	RESISTOR ARRAY	S
RA620	PFXBV8V470JV	RESISTOR ARRAY	S
RA621	PFXBV8V470JV	RESISTOR ARRAY	S
		(CERAMIC FILTERS)	
L600	PFVF1B601ST	CERAMIC FILTER	S
L601	PFVF1B601ST	CERAMIC FILTER	S
L602	PFVF1B601ST	CERAMIC FILTER	S
L603	PFVF1B601ST	CERAMIC FILTER	S
L604	PFVF1B601ST	CERAMIC FILTER	S
L605	PFVF1B601ST	CERAMIC FILTER	S
L606	PFVF1B601ST	CERAMIC FILTER	S
L607	PFVF1B601ST	CERAMIC FILTER	S
L608	PFVF1B601ST	CERAMIC FILTER	S
L609	PFVF1B601ST	CERAMIC FILTER	S
L610	PFVF1B601ST	CERAMIC FILTER	S
L611	PFVF1B601ST	CERAMIC FILTER	S
L612	PFVF1B601ST	CERAMIC FILTER	S
L613	PFVF1B601ST	CERAMIC FILTER	S
L614	PFVF1B601ST	CERAMIC FILTER	S
L615	PFVF1B601ST	CERAMIC FILTER	S
L616	PFVF1B601ST	CERAMIC FILTER	S
L622	PFVF1B601ST	CERAMIC FILTER	S
L623	PFVF1B601ST	CERAMIC FILTER	S
L624	PFVF1B601ST	CERAMIC FILTER	S
L625	PFVF1B601ST	CERAMIC FILTER	S
L626	PFVF1B252SDT	CERAMIC FILTER	S
L627	PFVF1B252SDT	CERAMIC FILTER	S
L639	PFVF1B601ST	CERAMIC FILTER	S
L640	PFVF1B252SDT	CERAMIC FILTER	S
L641	PFVF1B252SDT	CERAMIC FILTER	S
L642	PFVF1B252SDT	CERAMIC FILTER	S
L648	PFVF1B252SDT	CERAMIC FILTER	S
L650	PFVF1B252SDT	CERAMIC FILTER	S
L651	PFVF1B252SDT	CERAMIC FILTER	S
L652	PFVF1B252SDT	CERAMIC FILTER	S
L654	PFVF1B252SDT	CERAMIC FILTER	S
L655	PFVF1B252SDT	CERAMIC FILTER	S
L656	PFVF1B252SDT	CERAMIC FILTER	S
L657	PFVF1B252SDT	CERAMIC FILTER	S
L658	PFVF1B252SDT	CERAMIC FILTER	S
L659	PFVF1B252SDT	CERAMIC FILTER	S
L660	PFVF1B252SDT	CERAMIC FILTER	S
L661	PFVF1B252SDT	CERAMIC FILTER	S
L662	PFVF1B252SDT	CERAMIC FILTER	S
L663	PFVF1B252SDT	CERAMIC FILTER	S

Ref. No.	Part No.	Part Name & Description	Remarks
L664	PFVF1B252SDT	CERAMIC FILTER	S
L665	PFVF1B252SDT	CERAMIC FILTER	S
L666	PFVF1B252SDT	CERAMIC FILTER	S
L667	PFVF1B252SDT	CERAMIC FILTER	S
L673	PFVF1B252SDT	CERAMIC FILTER	S
L674	PFVF1B252SDT	CERAMIC FILTER	S
L678	PFVF1B252SDT	CERAMIC FILTER	S
L680	PFVF1B252SDT	CERAMIC FILTER	S
L681	PFVF1B252SDT	CERAMIC FILTER	S
L682	PFVF1B252SDT	CERAMIC FILTER	S
L683	PFVF1B252SDT	CERAMIC FILTER	S
L684	PFVF1B252SDT	CERAMIC FILTER	S
L685	PFVF1B252SDT	CERAMIC FILTER	S
L686	PFVF1B252SDT	CERAMIC FILTER	S
R752	PFVF1B252SDT	CERAMIC FILTER	S
R753	PFVF1B252SDT	CERAMIC FILTER	S
		(RESISOTRS)	
L630	PQ4R10XJ000	0	S
L634	PQ4R10XJ000	0	S
L636	ERJ3GEY0R00	0	
L637	ERJ3GEYJ4R7	4.7	
L645	ERJ3GEY0R00	0	
L646	ERJ3GEY0R00	0	
L647	ERJ3GEY0R00	0	
L668	PQ4R10XJ000	0	S
R600	PQ4R10XJ000	0	S
R606	ERJ3GEY0R00	0	
R607	ERJ3GEYJ103	10k	
R608	ERJ3GEYJ101	100	
R609	ERJ14YJ4R7	4.7	
R610	ERJ3GEY0R00	0	
R611	ERJ3GEYJ103	10k	
R612	ERJ3GEYJ101	100	
R613	ERJ14YJ4R7	4.7	
R617	ERJ14YJ472	4.7k	
R618	ERJ14YJ472	4.7k	
R619	ERJ3GEYJ102	1k	
R620	ERJ3GEYJ562	5.6k	
R621	ERJ3GEYJ563	56k	
R623	ERJ3GEYJ103	10k	
R624	ERJ3GEYJ103	10k	
R625	ERJ3GEYJ101	100	
R640	ERJ3GEYJ152	1.5k	
R641	ERJ3GEYJ104	100k	
R642	ERJ3GEYJ152	1.5k	
R643	ERJ3GEYJ332	3.3k	
R644	ERJ3GEYJ822	8.2k	
R645	ERJ3GEYJ103	10k	
R646	ERJ3GEYJ222	2.2k	
R647	ERJ3GEYJ103	10k	
R648	ERJ6GEY0R00	0	
R649	ERJ3GEYJ103	10k	
R650	ERG2SJ391	390	
R651	ERJ3GEYJ101	100	

Ref. No.	Part No.	Part Name & Description	Remarks
R652	ERJ3GEYJ101	100	
R653	ERJ3GEYJ563	56k	
R654	ERJ3GEYJ222	2.2k	
R655	ERJ3GEYJ472	4.7k	
R657	ERJ3GEYJ220	22	
R658	ERJ3GEYJ122	1.2k	
R659	ERJ3GEYJ221	220	
R660	ERJ3GEYJ101	100	
R661	ERJ3GEYJ105	1M	
R662	ERJ3GEYJ101	100	
R663	ERJ3GEYJ475	4.7M	
R665	ERJ3GEYJ103	10k	
R669	PQ4R10XJ000	0	S
R671	ERJ3GEY0R00	0	
R672	ERJ3GEY0R00	0	
R673	ERJ3GEY0R00	0	
R675	ERJ3GEYJ220	22	
R676	ERJ3GEYJ220	22	
R677	ERJ3GEYJ103	10k	
R678	ERJ3GEYJ103	10k	
R679	ERJ3GEYJ103	10k	
R680	ERJ3GEYJ103	10k	
R681	ERJ3GEYJ103	10k	
R686	ERJ3GEYJ392	3.9k	
R687	ERJ3GEYJ101	100	
R688	ERJ3GEYJ331	330	
R689	ERJ14YJ472	4.7k	
R690	ERJ3GEYJ103	10k	
R691	ERJ3EKF6801	6.8k	
R693	ERJ3GEYJ562	5.6k	
R694	ERJ3GEYJ563	56k	
R695	ERJ3GEY0R00	0	
R696	ERJ3GEY0R00	0	
R697	ERJ3GEY0R00	0	
R698	ERJ3GEY0R00	0	
R699	ERJ3GEY0R00	0	
R700	ERJ3EKF1802	18k	
R702	ERJ3GEYJ103	10k	
R703	ERJ3GEYJ103	10k	
R704	ERJ3GEYJ103	10k	
R705	ERJ3GEYJ104	100k	
R706	ERJ3GEYJ332	3.3k	
R707	ERJ3GEYJ562	5.6k	
R711	ERJ3GEYJ102	1k	
R712	ERJ3GEYJ101	100	
R713	ERJ3GEYJ101	100	
R714	ERJ3GEYJ101	100	
R715	ERJ3GEYJ101	100	
R716	ERJ3GEYJ101	100	
R717	ERJ3GEYJ102	1k	
R718	ERJ3GEYJ102	1k	
R719	ERJ3GEYJ103	10k	
R720	ERJ3GEYJ472	4.7k	
R721	ERJ3GEYJ272	2.7k	

Ref. No.	Part No.	Part Name & Description	Remarks
R722	ERJ3GEYJ393	39k	
R723	ERJ3GEYJ101	100	
R724	ERJ3GEYJ103	10k	
R725	ERJ3GEYJ103	10k	
R726	ERJ3GEYJ102	1k	
R727	ERJ3GEYJ103	10k	
R728	ERJ3GEYJ103	10k	
R729	ERJ3GEYJ473	47k	
R730	ERJ3GEYJ473	47k	
R731	ERJ3GEY0R00	0	
R732	ERJ3GEY0R00	0	
R733	ERJ3GEYJ103	10k	
R734	ERJ3GEYJ101	100	
R735	ERJ3GEYJ101	100	
R736	ERJ3GEYJ101	100	
R737	ERJ3GEYJ333	33k	
R738	ERJ3GEYJ562	5.6k	
R739	ERJ3GEYJ103	10k	
R740	ERJ3GEY0R00	0	
R748	ERJ3GEYJ101	100	
R749	ERJ3GEYJ101	100	
R750	ERJ3GEYJ101	100	
R754	ERJ3GEYJ103	10k	
R755	ERJ3GEYJ103	10k	
R756	ERJ3GEYJ103	10k	
R757	ERJ3GEYJ103	10k	
R758	ERJ3GEYJ103	10k	
R759	ERJ3GEYJ103	10k	
R760	ERJ3GEYJ563	56k	
R761	ERJ3GEYJ563	56k	
R763	ERJ3GEYJ220	22	
R764	ERJ3GEYJ103	10k	
R765	ERJ3GEYJ102	1k	
R766	ERJ3GEYJ103	10k	
R769	ERX1SJ2R2	2.2	
R774	ERJ14YJ472	4.7k	
R775	ERJ3GEYJ103	10k	
R776	ERJ3GEYF393	39k	S
R777	ERJ3GEYJ103	10k	
R779	ERJ3GEYJ220	22	
R780	ERJ3GEYJ220	22	
R781	ERJ3GEYJ220	22	
R782	ERJ3GEYJ220	22	
R783	ERJ3GEYJ220	22	
R784	ERJ3GEYJ220	22	
R785	ERJ3GEYJ220	22	
R786	ERJ3GEYJ220	22	
R787	ERJ3GEYJ220	22	
R788	PQ4R10XJ000	0	S
R792	ERJ3GEYJ103	10k	
R793	ERJ3GEYJ103	10k	
R796	PQ4R10XJ000	0	S
R799	PQ4R10XJ000	0	S
R800	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
RA600	D1H81024A010	1k	
RA601	D1H81024A010	1k	
RA602	D1H81024A010	1k	
RA603	D1H81024A010	1k	
RA604	D1H82204A010	22	
RA610	D1H82204A010	22	
RA612	D1H81034A010	10k	
RA613	D1H81034A010	10k	
RA614	D1H81034A010	10k	
RA617	D1H81034A010	10k	
RA622	D1H82204A010	22	
RA623	D1H82204A010	22	
RA624	D1H82204A010	22	
RA625	D1H82204A010	22	
RA626	D1H82204A010	22	
		(CRYSTAL OSCILLATORS)	
X600	H0J282500005	CRYSTAL OSCILLATOR	
X601	PFVCCFS32Z	CRYSTAL OSCILLATOR	S

12.4. ANALOG BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB2	PFLP1377MZ-A	ANALOG BOARD ASS'Y	
		(ICs)	
IC201	AN6384SB	IC	
IC202	C1BB00000101	IC	
IC203	PQVIMC34119D	IC	S
IC204	PFVINJM4558M	IC	S
IC207	PFVINJM4558M	IC	S
		(TRANSISTORS)	
Q201	2SD1921Q	TRANSISTOR(SI)	S
Q210	PQVTDTC143E	TRANSISTOR(SI)	S
Q213	PQVTDTC143E	TRANSISTOR(SI)	S
		(DIODES)	
D201	MA4056	DIODE(SI)	
D202	MA4056	DIODE(SI)	
D203	MA4056	DIODE(SI)	
D208	1SS133	DIODE(SI)	S
D211	MA4056	DIODE(SI)	
D212	MA4056	DIODE(SI)	
D213	1SS133	DIODE(SI)	S
D214	1SS133	DIODE(SI)	S
DA201	MA143	DIODE(SI)	
		(CONNECTORS)	
CN201	PQJP02G100Z	CONNECTOR, 2PIN	
CN202	PQJS28X59Z	CONNECTOR, 28PIN	
		(JACKS)	
CN203	PFJJ1T01Z	JACK	S
CN204	PQJJ1TB18Z	JACK	S
CN205	PFJJ1T01Z	JACK	S
		(COILS)	
L235	PQLQR1E32A07	COIL	S
L236	PQLQR1E32A07	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
L238	PQLQR1E32A07	COIL	S
L239	PQLQR1E32A07	COIL	S
		(CERAMIC FILTERS)	
L202	PFVF1B252SDT	CERAMIC FILTER	S
L203	PFVF1B252SDT	CERAMIC FILTER	S
L205	PFVF1B252SDT	CERAMIC FILTER	S
L206	PFVF1B252SDT	CERAMIC FILTER	S
		(CAPACITORS)	
C201	ECUV1H331JCV	330p	S
C203	ECUV1H391JCV	390p	S
C209	ECUV1C104ZFV	0.1	
C210	ECUV1C104KBV	0.1	
C211	ECEA0JU331	330	S
C212	ECUV1H152KBV	0.0015	
C213	ECUV1C104ZFV	0.1	
C214	ECUV1C104KBV	0.1	
C215	ECUV1C104ZFV	0.1	
C216	ECEA1HU100	10	S
C218	ECUV1C104ZFV	0.1	
C219	ECUV1C104KBV	0.1	
C220	ECUV1H681JCV	680p	S
C221	ECEA1VU101	100	S
C222	ECUV1H330JCV	33p	
C223	ECUV1H390JCV	39p	
C224	ECUV1C104KBV	0.1	
C225	ECUV1C104ZFV	0.1	
C226	ECUV1H333KBV	0.033	S
C227	ECUV1C104KBV	0.1	
C228	ECEA1EU101	100	S
C229	ECEA0JK221	220	S
C230	ECUV1C104ZFV	0.1	
C231	ECUV1C104ZFV	0.1	
C234	ECUV1C104ZFV	0.1	
C235	ECUV1H152KBV	0.0015	
C236	ECEA1HKS010	1	S
C237	ECEA0JK221	220	S
C239	ECUV1A224KBV	0.22	
C240	ECUV1A105ZFV	1	
C241	ECUV1A105ZFV	1	
C242	ECUV1H333KBV	0.033	S
C243	ECUV1C104KBV	0.1	
C244	ECUV1A224KBV	0.22	
C246	ECUV1H102KBV	0.001	
C247	ECUV1H270JCV	27p	
C248	ECUV1H681JCV	680p	S
C250	ECEA1AU101	100	S
C252	ECUV1H681JCV	680p	S
C254	ECUV1C104KBV	0.1	
C256	ECUV1C104KBV	0.1	
C257	ECUV1H472KBV	0.0047	
C262	ECUV1H391JCV	390p	S
C266	ECEA1CKS100	10	S
C268	ECUV1C563KBV	0.056	
C270	ECUV1H391JCV	390p	S

Ref. No.	Part No.	Part Name & Description	Remarks
C273	ECUV1C104ZFV	0.1	
C274	ECEA1VU101	100	S
C275	ECUV1C104ZFV	0.1	
C279	ECEA1VU101	100	S
C280	ECUV1H820JCV	82p	
C285	ECUV1C104KBV	0.1	
C288	ECUV1C104KBV	0.1	
C289	ECUV1H820JCV	82p	
C300	ECUV1H182KBV	0.0018	
C304	ECUV1H470JCV	47p	
C306	ECUV1A224KBV	0.22	
C312	ECEA1HKS4R7	4.7	S
C343	ECQE2E105KZ	1	S
C348	ECUV1C104ZFV	0.1	
C350	ECUV1H333KBV	0.033	S
C351	ECUV1H333KBV	0.033	S
C354	ECUV1H103KBV	0.01	
C357	ECUV1H103KBV	0.01	
C359	ECEA1CKS100	10	S
C360	ECEA1EU470	47	S
C363	ECUV1H103KBV	0.01	
C372	ECEA1EU101	100	S
C379	ECUV1A224KBV	0.22	
		(RESISOTRS)	
J211	ERJ3GEY0R00	0	
J229	ERJ3GEY0R00	0	
J230	ERJ3GEY0R00	0	
J369	ERJ3GEY0R00	0	
J378	ERJ3GEY0R00	0	
J385	ERJ3GEY0R00	0	
L207	ERJ3GEY0R00	0	
L209	ERJ3GEY0R00	0	
L210	ERJ3GEY0R00	0	
L211	ERJ3GEY0R00	0	
L212	ERJ3GEY0R00	0	
L214	ERJ3GEY0R00	0	
L215	ERJ3GEY0R00	0	
L216	ERJ3GEY0R00	0	
L217	ERJ3GEY0R00	0	
L218	ERJ3GEY0R00	0	
L219	ERJ3GEY0R00	0	
L220	ERJ3GEY0R00	0	
L224	ERJ3GEY0R00	0	
L225	ERJ3GEY0R00	0	
L226	ERJ3GEY0R00	0	
L227	ERJ3GEY0R00	0	
L228	ERJ3GEYJ103	10k	
L231	ERJ3GEY0R00	0	
L245	ERJ3GEY0R00	0	
L246	ERJ3GEY0R00	0	
L247	ERJ3GEY0R00	0	
L248	ERJ3GEY0R00	0	
L253	ERJ3GEY0R00	0	
L254	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
L256	ERJ3GEY0R00	0	
L257	ERJ3GEY0R00	0	
L262	ERJ3GEY0R00	0	
L263	ERJ3GEY0R00	0	
L264	ERJ3GEY0R00	0	
L265	ERJ3GEY0R00	0	
R201	ERJ3GEYJ101	100	
R202	ERJ3GEYJ101	100	
R203	ERJ3GEYJ101	100	
R204	ERJ3GEYJ124	120k	
R205	ERJ3GEYJ274	270k	
R206	ERJ3GEYJ472	4.7k	
R207	ERJ3GEYJ223	22k	
R208	ERJ3GEYJ154	150k	
R209	ERJ3GEYJ822	8.2k	
R210	ERJ3GEYJ124	120k	
R212	ERJ3GEYJ224	220k	
R213	ERJ3GEYJ224	220k	
R214	ERJ3GEYJ394	390k	
R216	ERJ3GEYJ183	18k	
R217	ERJ3GEY0R00	0	
R218	ERJ3GEYJ123	12k	
R219	ERJ3GEYJ334	330k	
R220	ERJ3GEYJ244	240k	
R221	ERJ3GEYJ563	56k	
R222	ERJ3GEYJ153	15k	
R223	ERJ3GEYJ103	10k	
R224	ERJ3GEYJ223	22k	
R225	ERJ3GEYJ223	22k	
R226	ERJ3GEYJ4R7	4.7	
R227	ERJ3GEYJ394	390k	
R228	ERJ3GEYJ223	22k	
R229	ERJ3GEYJ223	22k	
R230	ERJ3GEYJ822	8.2k	
R231	ERJ3GEYJ222	2.2k	
R232	ERJ3GEYJ102	1k	
R233	ERJ3GEYJ103	10k	
R234	ERJ3GEYJ123	12k	
R235	ERJ3GEYJ472	4.7k	
R236	ERJ3GEYJ103	10k	
R237	ERJ3GEYJ103	10k	
R238	ERJ3GEYJ394	390k	
R239	ERJ3GEY0R00	0	
R240	ERJ3GEYJ4R7	4.7	
R241	ERJ3GEYJ394	390k	
R242	ERJ3GEYJ154	150k	
R243	ERJ3GEYJ124	120k	
R244	ERJ3GEY0R00	0	
R245	ERJ3GEY0R00	0	
R246	ERJ3GEYJ103	10k	
R247	ERJ3GEY0R00	0	
R248	ERJ3GEYJ473	47k	
R249	ERJ3GEYJ473	47k	
R250	ERJ3GEYJ273	27k	

Ref. No.	Part No.	Part Name & Description	Remarks
R254	ERJ3GEYJ273	27k	
R255	ERJ3GEY0R00	0	
R258	ERJ3GEYJ114	110k	
R265	ERJ3GEY0R00	0	
R267	ERJ3GEYJ473	47k	
R269	ERJ3GEYJ473	47k	
R270	ERJ3GEYJ114	110k	
R271	ERJ3GEY0R00	0	
R276	ERJ3GEYJ393	39k	
R277	ERJ3GEY0R00	0	
R278	ERJ3GEY0R00	0	
R280	ERJ3GEYJ104	100k	
R284	ERJ3GEY0R00	0	
R285	ERJ3GEY0R00	0	
R289	ERJ3GEYJ244	240k	
R291	ERJ3GEYJ103	10k	
R292	ERJ3GEYJ301	300	
R293	ERJ3GEY0R00	0	
R316	ERJ3GEYJ101	100	
R317	ERDSIVJ333	33k	S
R319	ERDS2TJ563	56K	S
R323	ERDS1VJ103	10k	S
R327	ERJ3GEYJ332	3.3k	
R329	ERJ3GEYJ103	10k	
R332	ERJ3GEYJ103	10k	
R333	ERJ3GEYJ331	330	
R335	ERJ3GEYJ563	56k	
R338	ERJ3GEYJ152	1.5k	
R341	ERJ3GEYJ332	3.3k	
R343	ERJ3GEYJ681	680	
R345	ERJ3GEYJ152	1.5k	
R356	ERG2SJ151	150	
R360	ERJ3GEYJ103	10k	
		(RELAY)	
RY202	PFSL003Z	RELAY	S
		(THERMISTOR)	
PO201	PQRPAR390N	THERMISTOR	S
		(PHOTO ELECTRIC TRANSDUCERS)	
PC204	0N3181	PHOTO COUPLER	
PC205	CNC7S102	PHOTO COUPLER	
PS201	CNA1006N	PHOTO SENSOR	
		(TRANSFORMER)	
T203	G4A1A0000151	TRANSFORMER	
		(VARISTORS)	
SA201	PQVDDSS301L	VARISTOR(SURGE ABSURBER)	S
SA202	PFRZRA102P6T	VARISTOR(SURGE ABSURBER)	S
		(SWITCH)	
SW201	ESE14A211	PUSH SWITCH	

12.5. OPERATION BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB3	PFLP1375MZ	OPARATION BOARD ASS'Y	
		(IC)	
IC101	MN7D032Z9J	IC	
		(LED)	
LED101	PFVLRM505VRT	DIODE(SI)	S
		(CONNECTOR & LCD)	
CN101	PQJP11G43Z	CONNECTOR, 11P	
CN104	PFAVM220	LIQUID CRYSTAL DISPLAY	
		(SWITCH)	
SW142	EVEGB141112B	PUSH SWITCH	
		(PHOTO ELECTRIC TRANSDUCERS)	
PS102	CNA1006N	PHOTO SENSOR	
PS103	CNA1006N	PHOTO SENSOR	
		(CAPACITORS)	
C110	ECUV1H103KBV	0.01	
C111	ECUV1H101JCV	100	
C115	ECUV1H101JCV	100	
C116	ECUV1H101JCV	100	
C117	ECUV1H101JCV	100	
C120	ECEA1CK101	100	S
C121	ECUV1C104ZFV	0.1	
C122	ECUV1C104ZFV	0.1	
C123	ECUV1C104ZFV	0.1	
C125	ECUV1C104ZFV	0.1	
C130	ECUV1C104ZFV	0.1	
C134	ECEA1CKS100	10	S
C135	ECEA1CKS100	10	S
C141	ECUV1C104ZFV	0.1	
		(RESISTORS)	
R101	ERJ3GEYJ102	1k	
R103	ERJ3GEYJ102	1k	
R105	ERJ3GEYJ101	100	
R106	ERJ3GEYJ101	100	
R107	ERJ3GEYJ101	100	
R111	ERJ3GEYJ101	100	
R112	ERJ3GEYJ101	100	
R113	ERJ3GEYJ101	100	
R114	ERJ3GEYJ181	180	
R116	ERJ3GEYJ181	180	
R119	ERJ3GEYJ181	180	
R120	ERJ3GEYJ181	180	
R121	ERJ3GEYJ181	180	
R122	ERJ3GEYJ181	180	
R123	ERJ3GEYJ181	180	
R126	ERJ3GEYJ181	180	
R130	ERJ3GEYJ273	27k	
R134	ERJ3GEYJ102	1k	
R138	ERJ3GEYJ103	10k	
R139	ERJ3GEYJ103	10k	
R142	ERJ3GEYJ181	180	
R143	ERJ3GEYJ331	330	
R145	ERJ3GEY0R00	0	
R146	ERJ3GEY0R00	0	
R147	ERJ3GEY0R00	0	

Ref. No.	Part No.	Part Name & Description	Remarks
R148	ERJ3GEY0R00	0	
R150	ERJ3GEYJ563	56k	
R151	ERJ3GEYJ331	330	
R156	ERJ3GEYJ103	10k	
		(SWITCHES)	
SW101	EVQ11Y05B	SWITCH	
SW102	EVQ11Y05B	SWITCH	
SW103	EVQ11Y05B	SWITCH	
SW104	EVQ11Y05B	SWITCH	
SW105	EVQ11Y05B	SWITCH	
SW106	EVQ11Y05B	SWITCH	
SW107	EVQ11Y05B	SWITCH	
SW108	EVQ11Y05B	SWITCH	
SW109	EVQ11Y05B	SWITCH	
SW110	EVQ11Y05B	SWITCH	
SW111	EVQ11Y05B	SWITCH	
SW112	EVQ11Y05B	SWITCH	
SW113	EVQ11Y05B	SWITCH	
SW115	EVQ11Y05B	SWITCH	
SW116	EVQ11Y05B	SWITCH	
SW117	EVQ11Y05B	SWITCH	
SW118	EVQ11Y05B	SWITCH	
SW119	EVQ11Y05B	SWITCH	
SW120	EVQ11Y05B	SWITCH	
SW121	EVQ11Y05B	SWITCH	
SW122	EVQ11Y05B	SWITCH	
SW123	EVQ11Y05B	SWITCH	
SW124	EVQ11Y05B	SWITCH	
SW125	EVQ11Y05B	SWITCH	
SW126	EVQ11Y05B	SWITCH	
SW127	EVQ11Y05B	SWITCH	
SW128	EVQ11Y05B	SWITCH	
SW129	EVQ11Y05B	SWITCH	
SW130	EVQ11Y05B	SWITCH	
SW131	EVQ11Y05B	SWITCH	
SW132	EVQ11Y05B	SWITCH	
SW135	EVQ11Y05B	SWITCH	
SW136	EVQ11Y05B	SWITCH	
SW137	EVQ11Y05B	SWITCH	
SW138	EVQ11Y05B	SWITCH	
SW139	EVQ11Y05B	SWITCH	
SW140	EVQ11Y05B	SWITCH	

12.6. HIGH VOLTAGE POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB4	EUKMBN802HA	HIGH VOLTAGE POWER SUPPLY BOARD ASS'Y(RTL)	⚠
		(IC)	
MC101	MC41H13	IC	
		(TRANSISTORS)	
Q101	2SD1990P	TRANSISTOR(SI)	
Q202	2SD2137A	TRANSISTOR(SI)	
Q204	2SA1413	TRANSISTOR(SI)	
		(DIODES)	
D102	PQVDS5688G	DIODE(SI)	
D103	PFVDDHM3M20	DIODE(SI)	S
D104	PFVDDHM3M20	DIODE(SI)	S
D110	MA165	DIODE(SI)	
D201	PQVDS5688G	DIODE(SI)	
D202	PFVDDHM3M20	DIODE(SI)	S
D203	PFVDDHM3M20	DIODE(SI)	S
D205	PQVDS5688G	DIODE(SI)	
ZD202	PQVDRD6.2ESB	DIODE(SI)	
ZD203	PFVDRD200EB	DIODE(SI)	S
		(CONNECTOR)	
CN2	PQJP9G30Y	CONNECTOR	
		(CAPACITORS)	
C101	ECA1VHG470	47	
C102	ECQV1H473JZ	0.047	
C103	ECEA50M1	1	
C104	ECEA50M2R2	2.2	
C106	ECQB1H153KF	0.015	
C107	ECKR2H102KB	0.001	
C108	ECKK3A471KB	470P	
C109	ECKK3D102KB	0.001	
C202	ECKK3A471KB	470P	
C203	ECKR1H472KB	0.0047	
C204	ECKK3D221KB	220P	
C206	ECQB1H103JF	0.01	
C207	ECKK3A471KB	470P	
C208	ECQE2103KS	0.01	
C209	ECKK3D102KB	0.001	
C210	ECKZ3A101KB	100P	S
C211	ECKZ3A101KB	100P	S
		(RESISTORS)	
R102	ERDS2TJ104	100k	
R103	ER0S2TKF7871	7.87k	
R104	ERDS2TJ103	10k	
R105	ER0S2CKF1002	10k	S
R106	ER0S2TKF1653	165k	
R107	ER0S2TKF6653	665k	
R108	ER0S2TKF8451	8.45k	
R110	ER0S2TKF1003	100k	
R113	ERDS2TJ102	1k	
R114	PFRGVR25J106	10M	S
R116	ERDS2TJ272	2.7k	
R117	ERDS2TJ272	2.7k	
R201	ERDS2TJ152	1.5k	
R202	ER0S2TKF1582	15.8k	
R206	ERDS2TJ102	1k	

Ref. No.	Part No.	Part Name & Description	Remarks
R209	PFRGVR25J105	1M	S
R210	ER0S2TKF2492	24.9k	
R211	PFRGR25F1504	1.5M	S
R214	PFRGVR25J105	1M	S
R215	PFRGVR25J105	1M	S
R216	ERDS2TJ333	33k	
R217	PFRGR25F1005	10M	S
R218	ERDS1TJ225	2.2M	
R219	ERDS2TJ473	47k	
R220	ERDS1TJ225	2.2M	
VR101	ER0S2TKF7871	7.87k	
		(FUSE)	
IP101	PFBAICPN38	FUSE	S
		(PHOTO ELECTRIC TRANSDUCER)	
PC201	PFVISG206S	PHOTO COUPLER	S
		(SWITCH)	
SW101	PFSEDE2LEALB	MICRO SWITCH	S ⚠
		(TRANSFORMERS)	
T101	MS15BTP20	TRANSFORMER	⚠
T201	ETB16GKL1	TRANSFORMER	⚠
		(VARIABLE RESISTORS)	
VR201	RVMAASA00B53	SEMI-FIXED	

12.7. LOW VOLTAGE POWER SUPPLY BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB5	N0AB12GE00001	POWER BOARD ASS'Y	
		(ICs)	
IC101	PFVIFA5317P	IC	S
IC201	AN1431T	IC	
IC202	PFVIPQ05RD11	IC	S
		(TRANSISTORS)	
Q101	2SK2662	TRANSISTOR(SI)	
		(DIODES)	
D101	PFVDLT1505	DIODE(SI)	S
D102	PFVDLT1505	DIODE(SI)	S
D103	PFVDLT1505	DIODE(SI)	S
D104	PFVDLT1505	DIODE(SI)	S
D105	PFVDAG01A	DIODE(SI)	S
D106	1SS133	DIODE(SI)	
D107	MA4220	DIODE(SI)	
D108	PFVDAU02Z	DIODE(SI)	S
D109	PFVDD1NL20U	DIODE(SI)	S
D201	PFVDSF5LC20U	DIODE(SI)	S
D202	PFVDRK36LFB2	DIODE(SI)	S
		(CONNECTORS)	
CN101	PQJP2D98Z	CONNECTOR, 2P	
CN102	PQJP2D98Z	CONNECTOR, 2P	
		(COILS)	
L101	PFLF11V10062	ELECTROLYTIC CAPACITOR, AL	S
L102	PFLF11V10062	ELECTROLYTIC CAPACITOR, AL	S
L103	PFLQSK10M5Y	COIL	S

Ref. No.	Part No.	Part Name & Description	Remarks
L104	EXCELDR35	COMPONENTS PARTS	
L108	EXCELDR35	COMPONENTS PARTS	
		(CAPACITORS)	
C101	ECQU2A224ML	0.22	
C102	ECQU2A224ML	0.22	
C103	PFKDE2GA222M	2200	S
C104	PFKDE2GA222M	2200	S
C106	PFEU200SX180	180	S
C108	ECKD3A102KBP	0.001	
C109	PFCEA35A47M	47	S
C110	PFKD12EGA222	2200	S
C111	ECQU2A104ML	0.1	
C112	ECQV1H104JZ	0.1	S
C119	ECKD3A221KBP	220p	
C121	ECUV1H472KBV	0.0047	
C122	ECUV1A224KBV	0.22	
C123	ECUV1H821KBV	820p	
C124	ECUV1E104KBV	0.1	
C202	ECKD3A102KBP	0.001	
C204	PFCEA35A47M	47	S
C205	PFCEA50A01M	0.1	S
C206	ECKD3A102KBP	0.001	
C210	ECUV1E104KBV	0.1	
C222	ECUV1H104KBX	0.1	
		(RESISTORS)	
J210	ERJ3GEYJ0R00	0	
R101	ERDS1J105	1M	
R102	ERDS2J394	390k	
R103	ERDS2J394	390k	
R105	ERX2SJR22	0.22	
R106	ERG2SJ470	47	
R108	ERDS2FJ150	15	
R109	ERDS2FJ220	22	
R110	ERDS2J473	47k	
R111	ERDS2J473	47k	
R112	ERDS1FJ121	120	
R113	ERDS2FJ101	100	
R114	ERDS1FJ220	22	
R121	ERJ3GEYJ103	10k	
R122	ERJ3GEYHJ821	820	
R124	ERJ3GEYHJ331	330	
R125	ERJ3GEYJ103	10k	
R126	ERJ3GEYHJ682	6.8k	
R127	ERJ3GEYHJ102	1k	
R128	ERJ3GEYHJ181	180	
R201	ERDS2J470	47	
R202	ERG2FJS152	1.5k	
R203	ERG2FJS152	1.5k	
R207	ERDS2J221	220	
R221	ERJ3GEYF222	2.2k	
R222	ERJ3GEYF222	2.2k	
R223	ERJ3GEYJ101	100	
R224	ERJ3GEYJ273	27k	
R225	ERJ3GEYJ332	3.3k	

Ref. No.	Part No.	Part Name & Description	Remarks
		(PHOTO ELECTRIC TRANSDUCERS)	
PC101	0N3131SKU	PHOTO COUPLER	S
PC102	PFVIS21ME6NY	PHOTO COUPLER	S
		(TRANSFORMERS)	
T101	ETS29AK6F5AC	TRANSFORMER	
		(VARISTOR)	
ZNR101	ERZV10D471	VARISTOR	
		(FUSE)	
F101	PFBA215063M	FUSE	S
		(VARIABLE RESISTOR)	
VR201	EVNDJAA03B53	SEMI-FIXED	

12.8. MOTOR DRIVE BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB6	PFLP1377MZ-B	MOTOR DRIVE BOARD ASS'Y (RTL)	
		(IC)	
IC1	PFVIMT200303	IC	
		(TRANSISTOR)	
Q1	PQVTDTC123JU	TRANSISTOR(SI)	
		(CONNECTORS)	
CN1	PQJP14G30Y	CONNECTOR,14P	S
CN2	PQJP4G30Z	CONNECTOR,4P	
		(CAPACITORS)	
C1	ECUV1C104KBV	0.1	S
C2	PFCA1HYK331M	330P	
C3	ECUV1C104KBV	0.1	S
C4	ECEA1CK101	100	S
C5	ECUV1C104KBV	0.1	S
C6	ECUV1C104KBV	0.1	S
C7	ECUV1H332KBV	0.0033	
C8	ECUV1C104KBV	0.1	S
		(RESISTORS)	
R1	ERJ3GEYJ331	330	
R2	ERX2SZGR47	0.47	
R3	ERJ3GEYJ221	220	
R4	ERX2SZGR47	0.47	
R5	ERJ3GEYJ183	18k	
		(FUSE RESISTOR)	
F1	PFRB0032315T	FUSE RESISTOR	
		(PHOTO ELECTRIC TRANSDUCERS)	
PS1	CNA1006N	PHOTO SENSOR	
PS50	PFVIRM574SL	PHOTO SENSOR	
		(OTHER)	
HSINK	PFMY1001Z	HEAT SINK	

12.9. SENSOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB7	PFLP1377MZ-C	SENSOR BOARD ASS'Y	
		(CONNECTORS)	
CN50	PQJP03A21Z	CONNECTOR,3PIN	
CN51	KIKA05B00D48	CONNECTOR,5PIN	S
PS50	PFVIRM574SL	EXIT SENSOR	

12.10. VARISTOR BOARD PARTS

Ref. No.	Part No.	Part Name & Description	Remarks
PCB8	PFLP1377MZ-D	VARISTOR BOARD ASS'Y(RTL)	
ZNR60	PFRV271NS05K	VARISTOR	

12.11. FIXTURES AND TOOLS

Ref. No.	Part No.	Part Name & Description	Remarks
EC1	PQZZ9K4Z	EXTENSION CORD, 9P	
EC2	PFZZ10K1Z	EXTENSION CORD, 10P	
EC3	PQZZ28F1Z	EXTENSION CORD, 28P	
EC4	PFZZ14K3Z	EXTENSION CORD, 14P	
EC5	PQZZ13K9Z	EXTENSION CORD, 13P	
EC6	PQZZ3K5Z	EXTENSION CORD, 3P	
EC7	PQZZ2K12Z	EXTENSION CORD, 2P	
EC8	PQZZ5K13Z	EXTENSION CORD, 5P	
EC9	PFZZ5K6Z	EXTENSION CORD, 5P	
EC10	PQZZ8K18Z	EXTENSION CORD, 8P	
EC11	PQZZ4K5Z	EXTENSION CORD, 4P	
EC12	PFZZ11K12Z	EXTENSION CORD, 11P	
	PFJFFLM551Z	FLOPPY DISK KIT FOR PC SOFT	
	PFJFFLM551Y	FLOPPY DISK KIT FOR OCR SOFT	
	KM79811245C0	BASIC FACSIMILE TECHNIQUE (for training service technicians)	

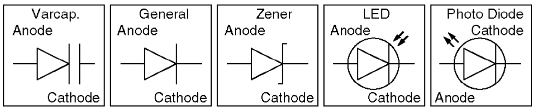
Note:

Tools and Extension Cords are useful for servicing.
(They make servicing easy.)

13. FOR THE SCHEMATIC DIAGRAMS

Note:

1. **DC voltage measurements are taken with an oscilloscope or a tester with a ground.**
2. **The schematic diagrams and circuit board may be modified at any time with the development of new technology.**
3.



Important safety notice
Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only the manufacturer's specified parts.

14. SCHEMATIC DIAGRAM (MAIN)

14.1. DIGITAL BOARD (PCB1)

15. SCHEMATIC DIAGRAM

15.1. ANALOG BOARD (PCB2)

15.2. OPERATION BOARD (PCB3)

15.3. HIGH VOLTAGE POWER SUPPLY BOARD (PCB4)

15.4. LOW VOLTAGE POWER SUPPLY BOARD (PCB5)

15.5. MOTOR DRIVE BOARD (PCB6)

15.6. SENSOR BOARD (PCB7)

15.7. VARISTOR BOARD (PCB8)

16. PRINTED CIRCUIT BOARD

16.1. DIGITAL BOARD (PCB1)

16.1.1. DIGITAL BOARD: COMPONENT VIEW

16.1.2. DIGITAL BOARD: BOTTOM VIEW

16.2. ANALOG BOARD (PCB2)

16.2.1. ANALOG BOARD: COMPONENT VIEW

16.2.2. ANALOG BOARD: BOTTOM VIEW

16.3. OPERATION BOARD (PCB3)

16.3.1. OPERATION BOARD:COMPONENT VIEW

16.3.2. OPERATION BOARD:BOTTOM VIEW

16.4. HIGH VOLTAGE POWER SUPPLY BOARD (PCB4)

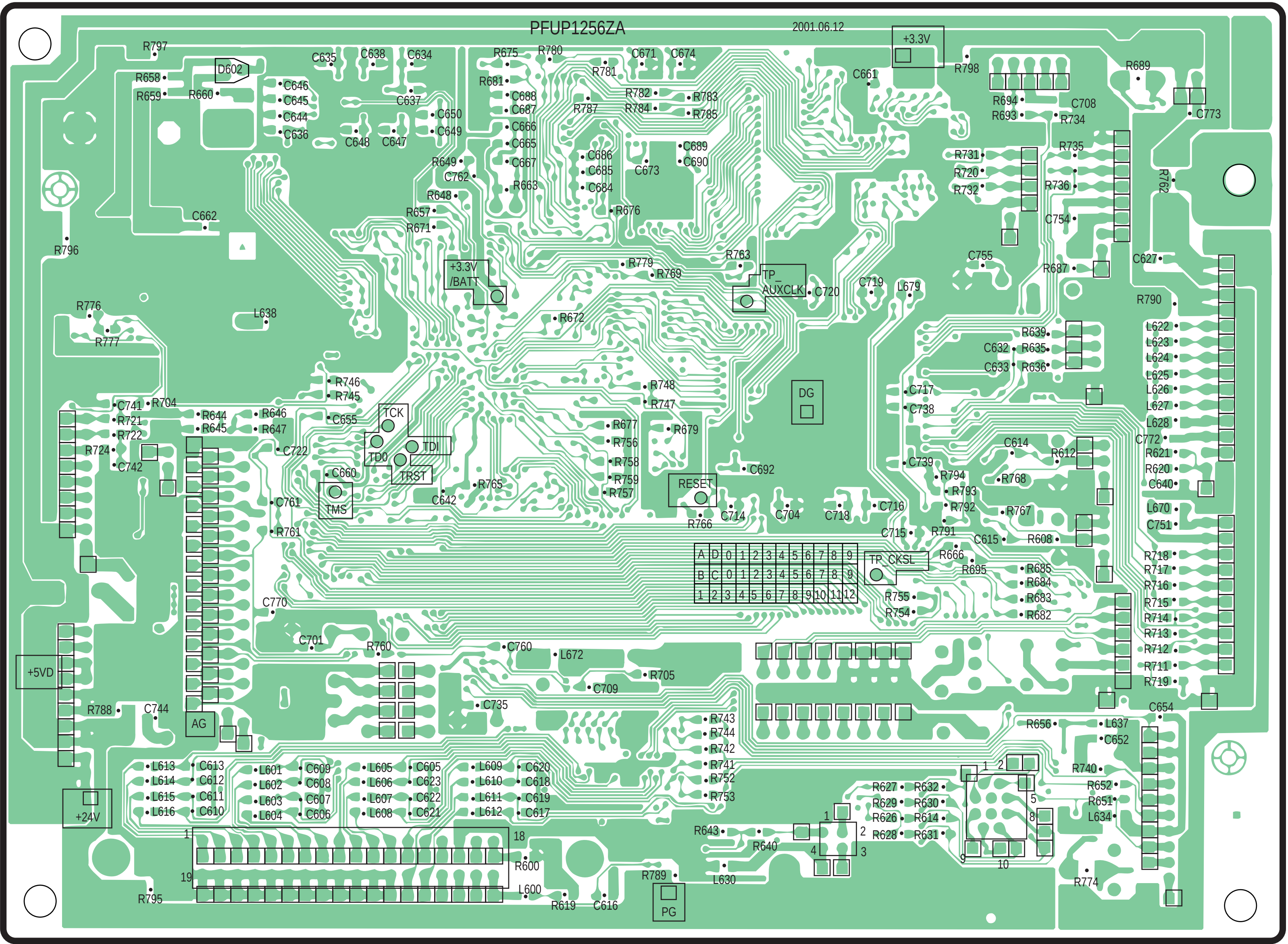
16.5. LOW VOLTAGE POWER SUPPLY BOARD (PCB5)

16.6. MOTOR DRIVE BOARD (PCB6)

16.7. SENSOR BOARD (PCB7)

16.8. VARISTOR BOARD (PCB8)

HI(Q) KXFLM551 / Printed in Japan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R659
R660
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C636
C637
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R681
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R732
R735
R736
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C754
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/BATT
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R763
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C755
R687
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R776
R777
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C633
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L626
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C741
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R722
R724
C742
R704
R644
R645
R646
R647
C655
TCK
TDI
TD0
TRST
C722
C660
TMS
C761
R761
C642
R765
R748
R747
R677
R756
R758
R759
R757
R679
DG
C717
C738
C739
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R612
R794
R793
R792
R791
R768
R767
C692
RESET
R766
C714
C704
C718
C716
C715
C615
R608
R666
R695
A
D
B
C
0
1
2
3
4
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6
7
8
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10
11
12
TP_CKSL
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R684
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R682
R755
R754
R718
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R716
R715
R714
R713
R712
R711
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R760
C760
L672
R705
C709
C735
+5VD
R788
C744
AG
R743
R744
R742
R741
R752
R753
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R656
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C652
R740
R652
R651
L634
R627
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C617
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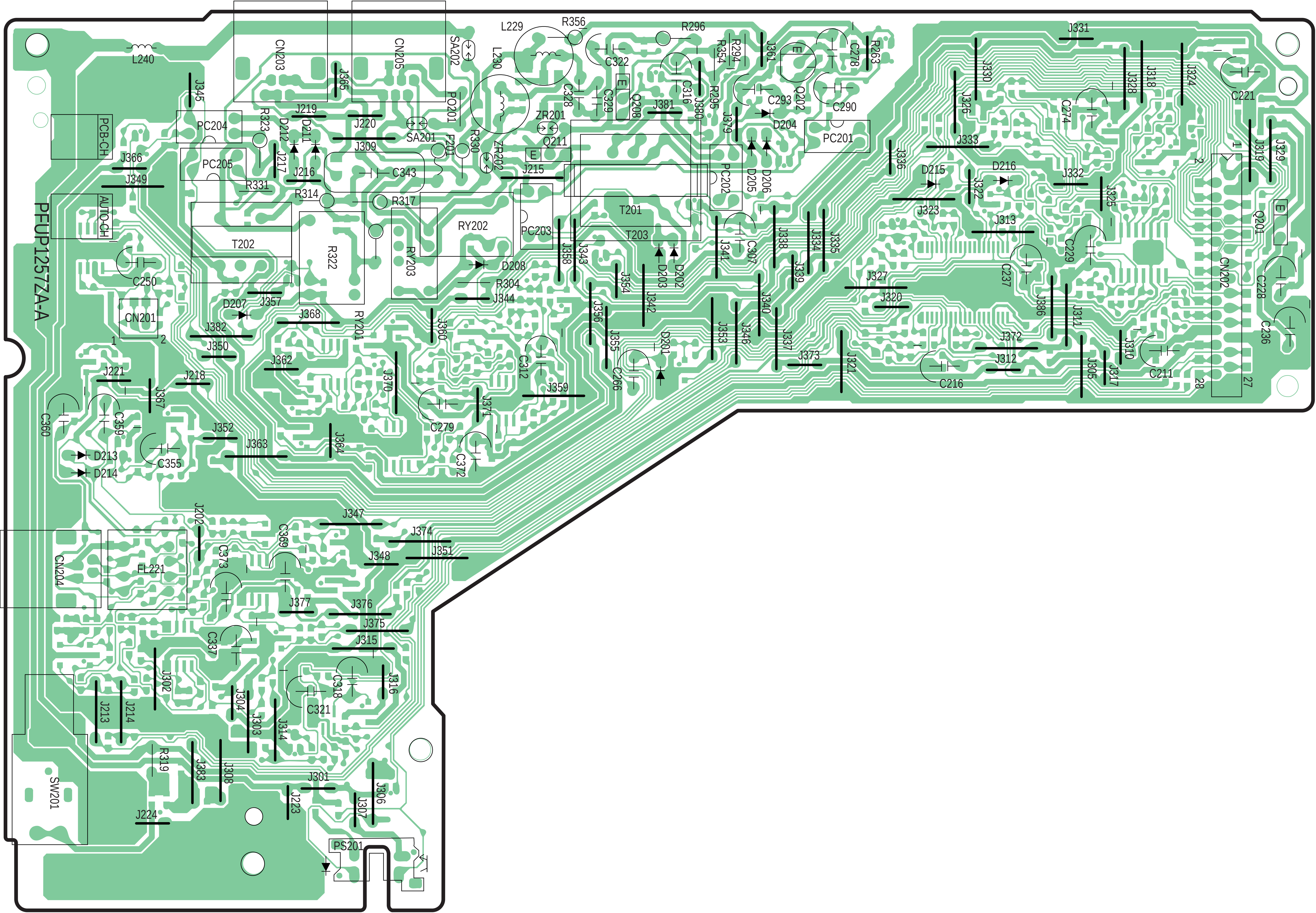
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PCB-CH
PC204
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ZR202
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PC201
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Q201
AUTO-CH
T202
R322
RY203
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R304
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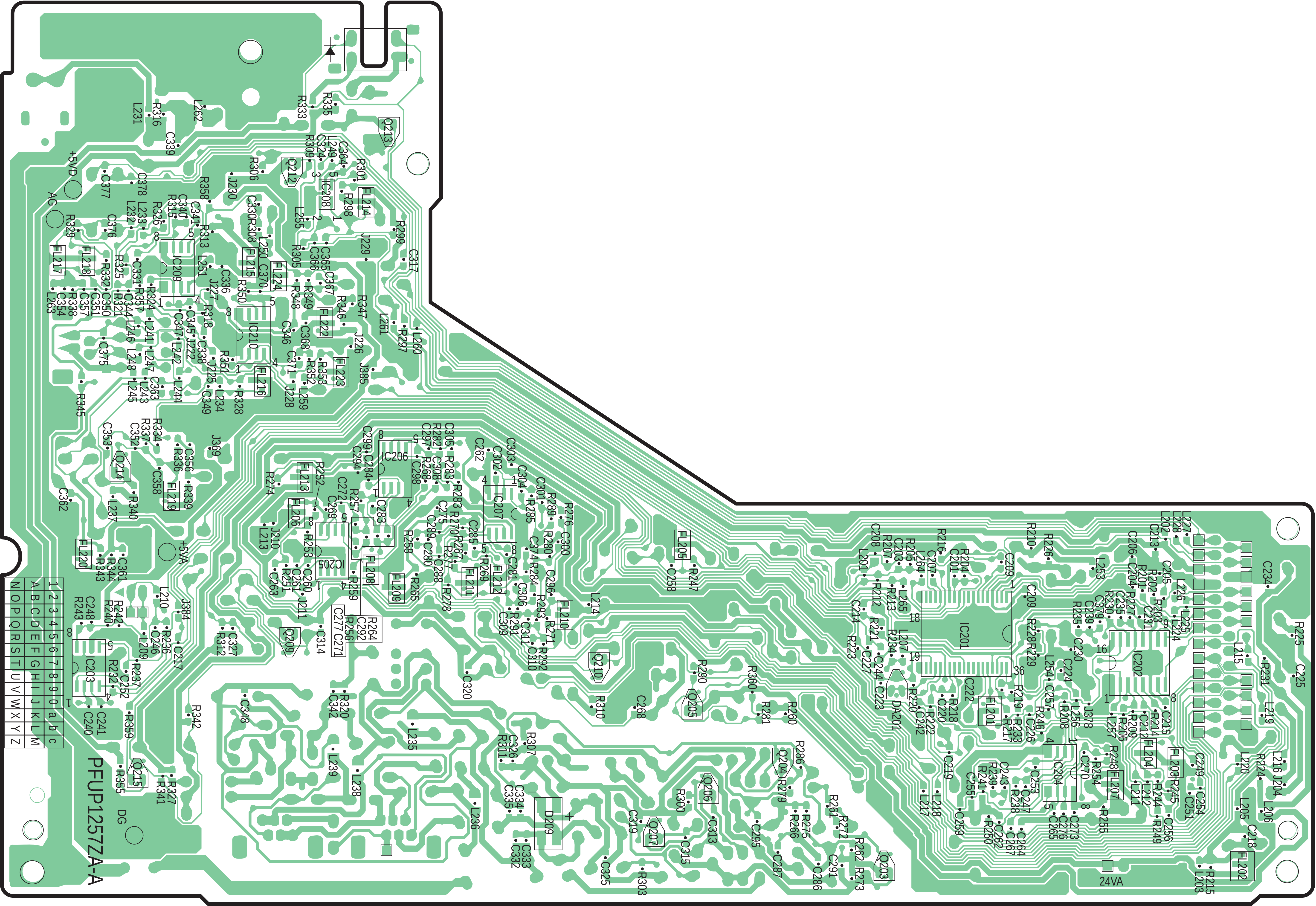
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+5VA
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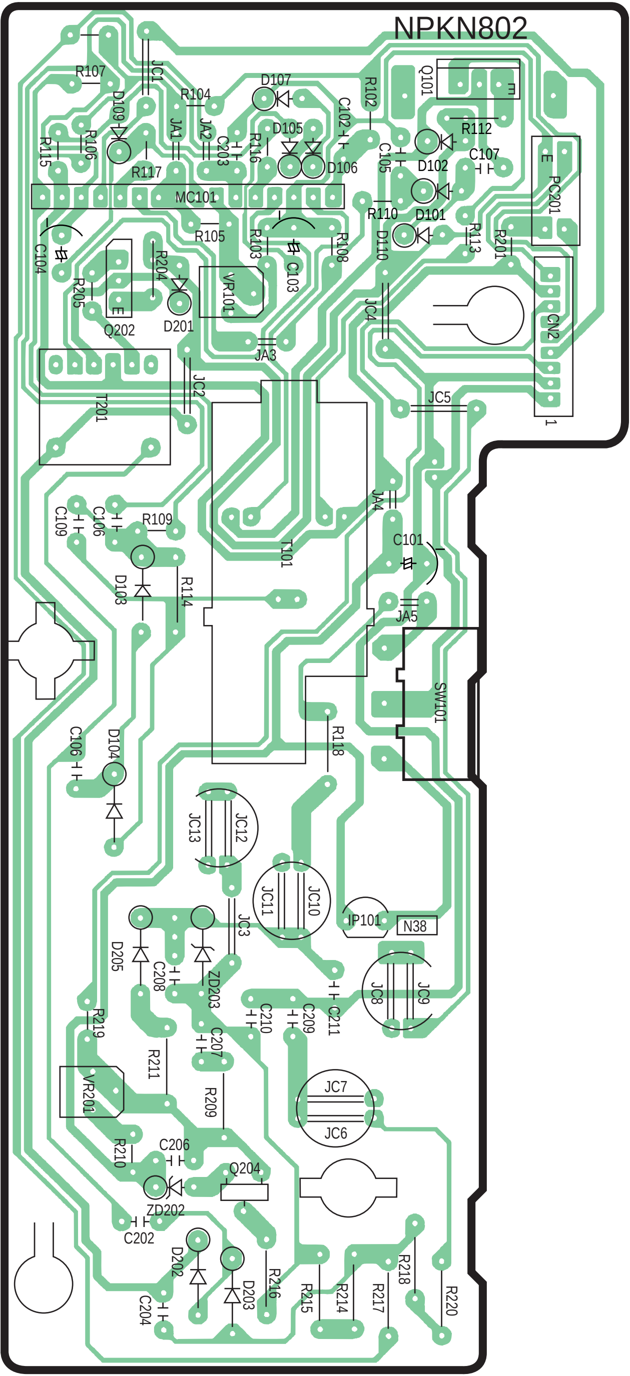
R359
R360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JC1
R104
D107
R102
Q101
E
D109
R106
R115
JA1
JA2
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R116
D105
C102
R112
C105
D102
C107
R117
D106
E
PC201
MC101
R110
D101
C104
R105
R103
C103
R108
D110
R113
R201
R204
VR101
R205
E
Q202
D201
JC4
CN2
JA3
JC2
T201
JC5
1
JA4
C109
C106
R109
T101
C101
D103
R114
JA5
SW101
R118
C106
D104
JC13
JC12
JC11
JC10
IP101
N38
JC3
D205
C208
ZD203
JC8
JC9
C210
C209
C211
R219
C207
R211
VR201
R209
JC7
JC6
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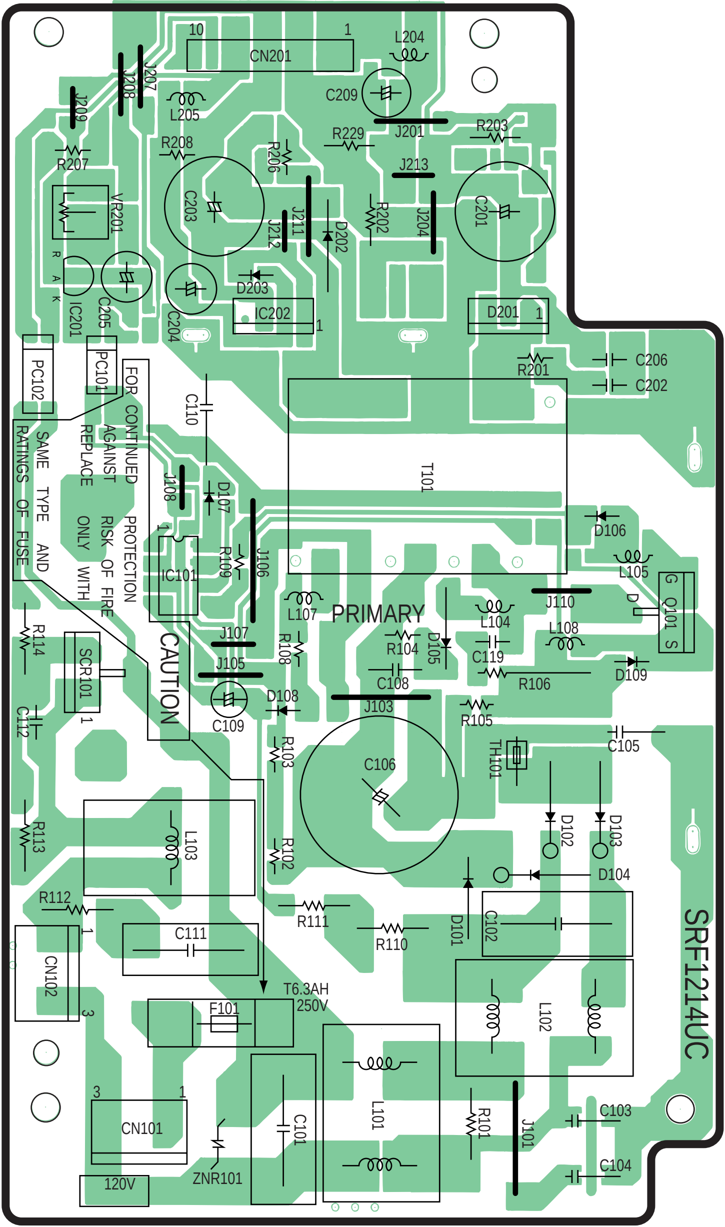
C206
Q204
ZD202
C202
D202
D203
R216
R215
R214
R217
R218
R220
C204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C203
J211
J212
R202
J204
C201
D202
R
A
K
IC201
C205
C204
D203
IC202
1
D201
1
PC102
PC101
R201
C206
C202
FOR CONTINUED PROTECTION AGAINST RISK OF FIRE REPLACE ONLY WITH SAME TYPE AND RATINGS OF FUSE
C110
T101
J108
D107
1
IC101
R109
J106
D106
L105
G
Q101
D
S
L107
PRIMARY
J110
L104
L108
R114
CAUTION
J107
R108
R104
D105
C119
SCR101
J105
C108
R106
D109
1
C112
C109
D108
J103
R105
R103
C105
TH101
C106
R113
L103
D102
D103
R102
D104
R112
R111
D101
C102
1
R110
CN102
C111
3
T6.3AH
250V
F101
L102
SRF1214UC
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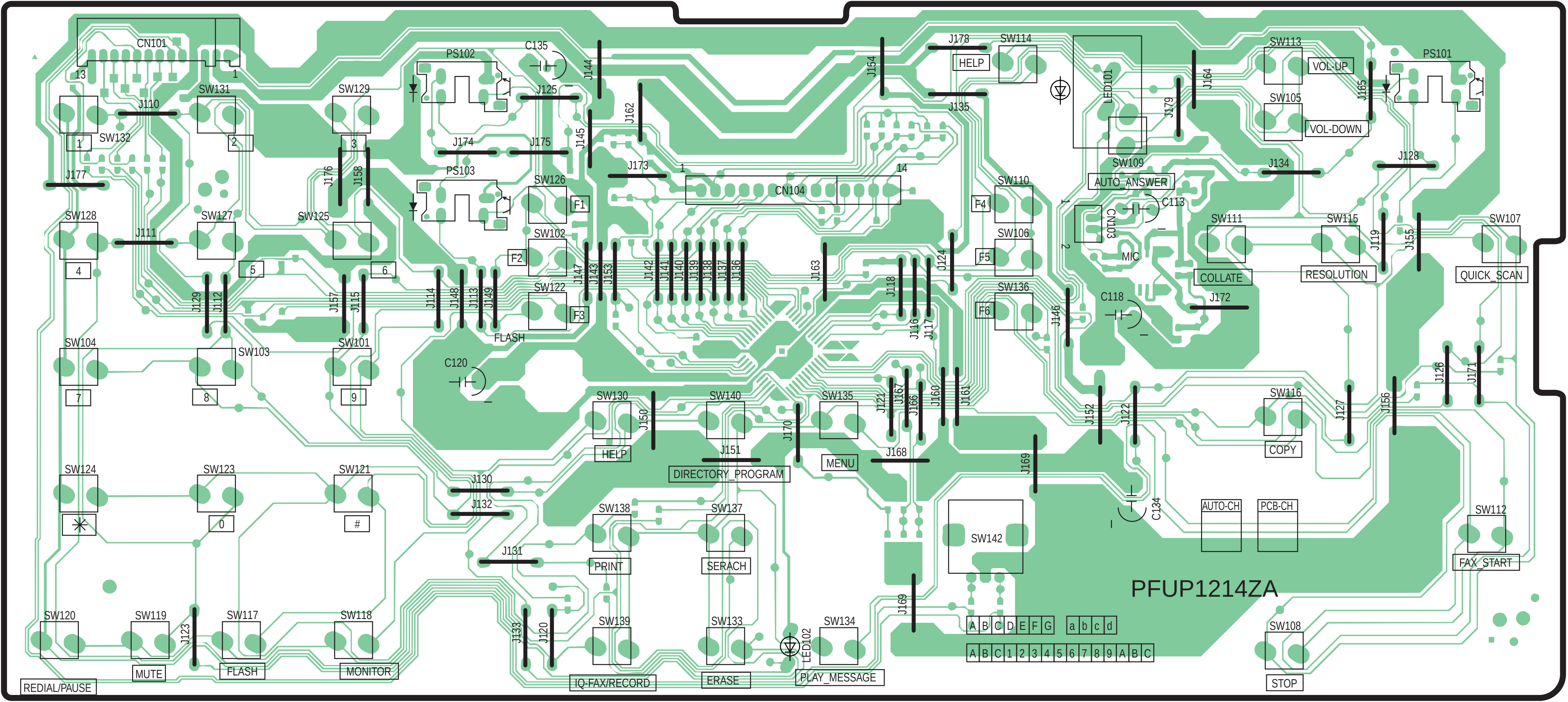
L101
R101
J101
C103
C101
ZNR101
C104
120V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13
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J110
SW131
SW132
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2
SW129
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PS102
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J125
J144
J162
J145
J174
J175
PS103
J173
J176
J158
J177
SW128
J111
SW127
SW125
4
5
6
SW126
F1
SW102
F2
SW122
F3
FLASH
J129
J112
J157
J115
J114
J148
J113
J149
J147
J143
J153
J142
J141
J140
J139
J138
J137
J136
J163
J154
J178
SW114
HELP
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LED101
J179
J164
SW113
VOL-UP
SW105
VOL-DOWN
J165
PS101
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CN104
14
SW110
F4
SW106
F5
SW136
F6
J118
J116
J117
J124
SW109
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CN103
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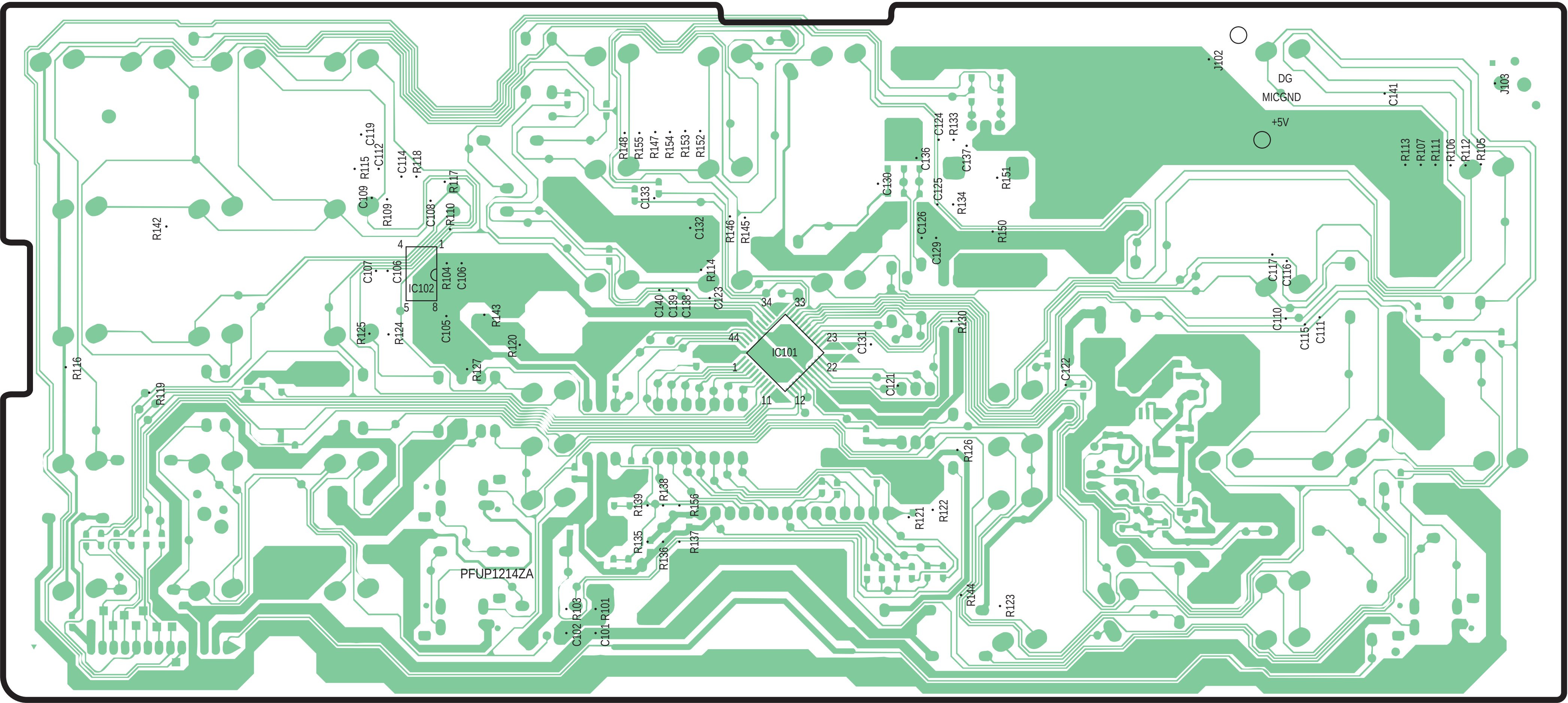
2
C113
MIC
J146
C118
J172
SW111
COLLATE
J134
J128
SW115
RESOLUTION
J119
J155
SW107
QUICK_SCAN
SW104
SW103
SW101
7
8
9
C120
SW130
HELP
J150
SW140
J151
DIRECTORY_PROGRAM
J170
SW135
MENU
J121
J167
J166
J160
J161
J168
J152
J122
SW116
COPY
J127
J156
J126
J171
SW124
SW123
SW121
0
#
J130
J132
J169
C134
AUTO-CH
PCB-CH
SW112
FAX_START
SW138
SW137
PRINT
SERACH
SW142
J131
PFUP1214ZA
SW120
SW119
SW117
SW118
J123
J133
J120
SW139
SW133
LED102
SW134
J169
A B C D E F G
a b c d
A B C 1 2 3 4 5 6 7 8 9 A B C
SW108
STOP
REDIAL/PAUSE
MUTE
FLASH
MONITOR
IQ-FAX/RECORD
ERASE
PLAY_MESSAGE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R107
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C137
R151
C130
C125
R134
C126
R150
C129
R148
R155
R147
R154
R153
R152
C133
C132
R146
R145
R114
C140
C139
C138
C123
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33
44
23
IC101
1
22
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12
C131
C121
R130
C122
C117
C116
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C115
C111
R126
R121
R122
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R139
R138
R156
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R137
C102
R103
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R101
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R115
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R117
R109
C108
R110
4
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C107
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R104
C106
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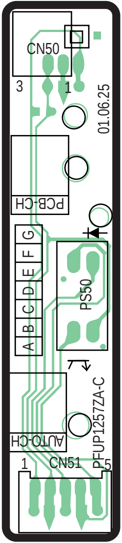
R125
R124
C105
R143
R120
R127

(COMPONENT VIEW)


CN50
3
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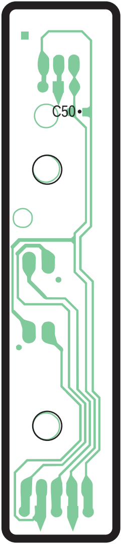
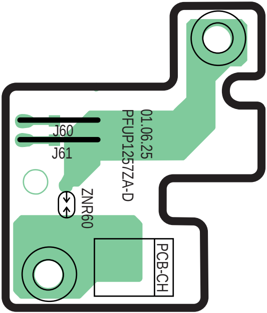
01.06.25
PCB-CH
G
F
E
D
C
B
A
PS50
PFUP1257ZA-C
AUTO-CH
1
CN51
5

(BOTTOM VIEW)



(COMPONENT VIEW)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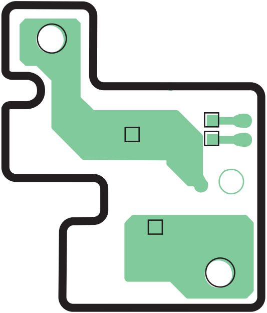
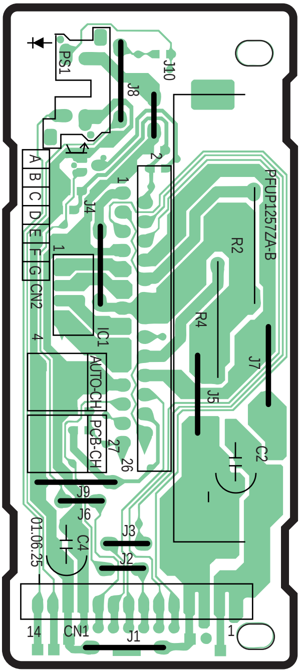
J61
ZNR60
01.06.25
PFUP1257ZA-D
PCB-CH

(BOTTOM VIEW)



(COMPONENT VIEW)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IC1
AUTO-CH
PCB-CH
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PFUP1257ZA-B
R2
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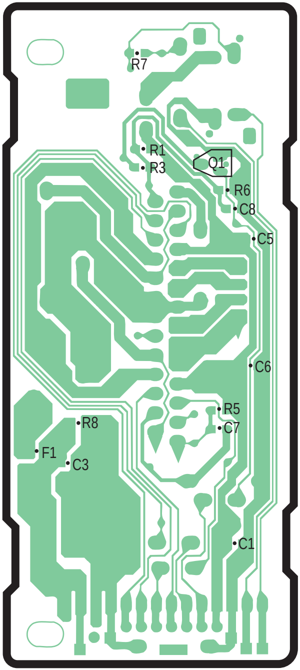
J7
J5
C2
J9
J6
C4
01.06.25
J3
J2
14
CN1
J1
1

(BOTTOM VIEW)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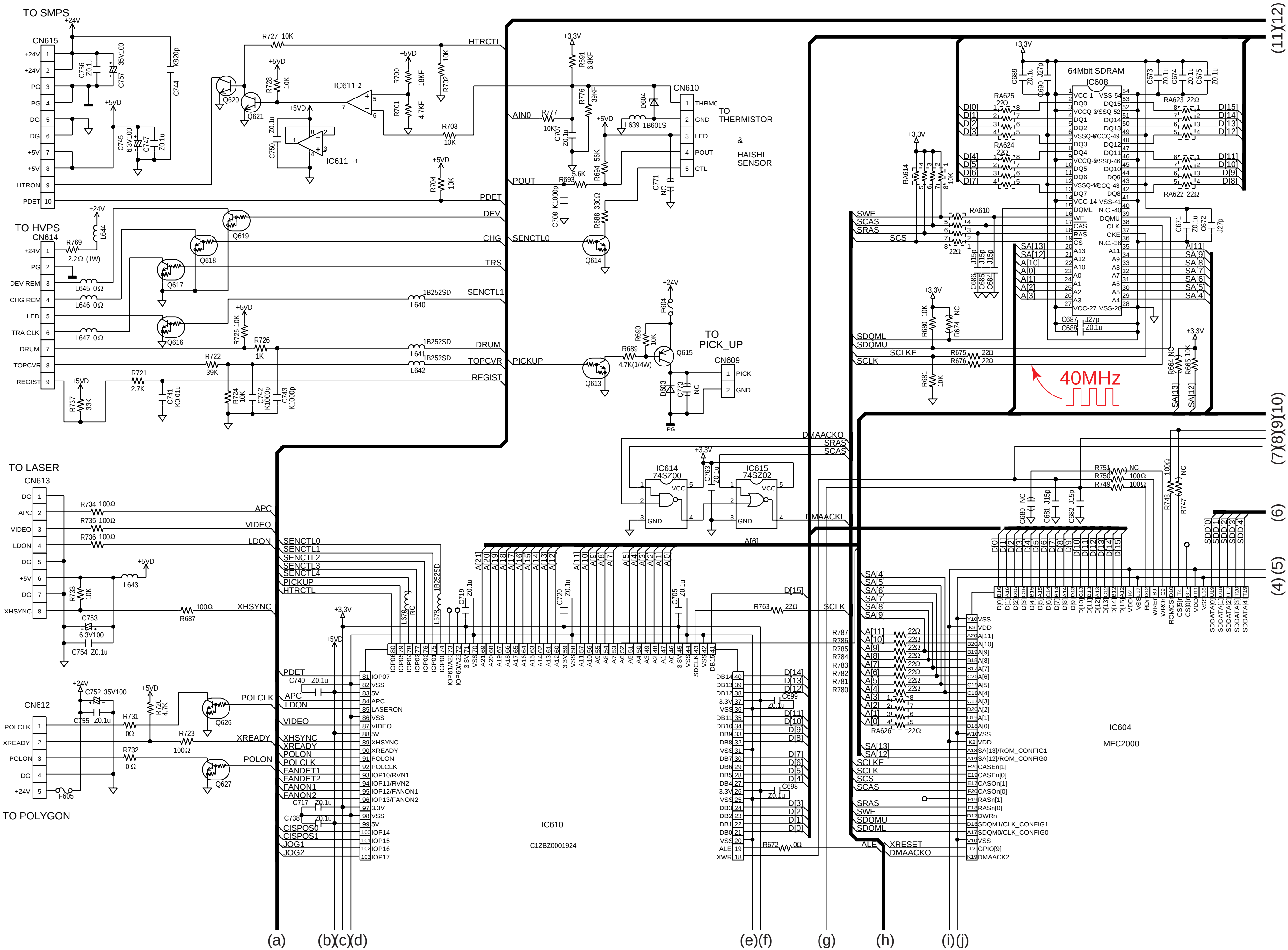
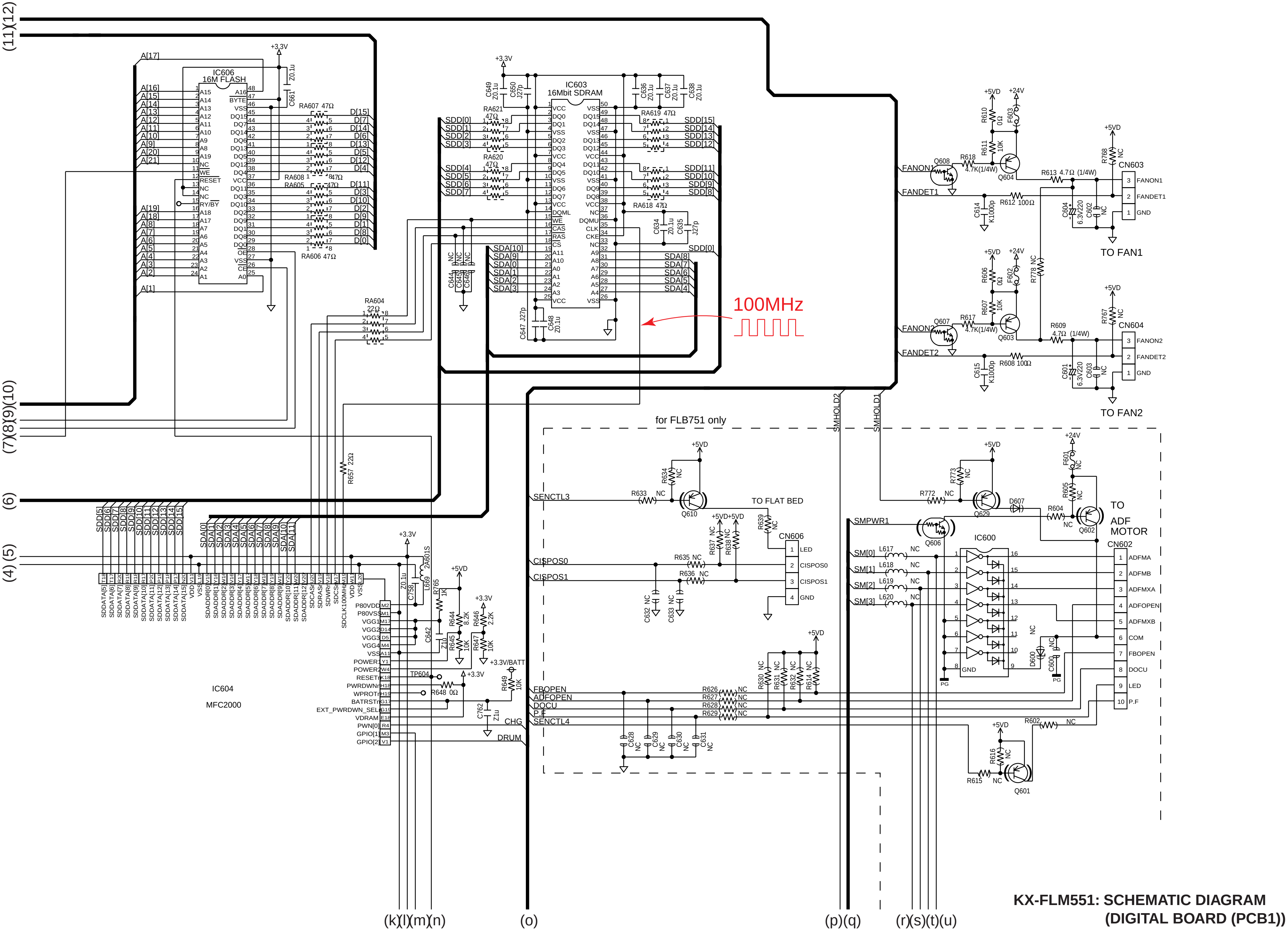
R1
R3
Q1
R6
C8
C5
C6
R5
R8
C7
F1
C3
C1


TO SMPS
CN615
+24V
PG
DG
+5V
HTRON
PDET
C756 Z0.1u
C757 35V100
C744 K820p
C745 6.3V100
C747 Z0.1u
R727 10K
HTRCTL
Q620
Q621
R728 10K
IC611-2
IC611-1
C750 Z0.1u
R700 18KF
R701 4.7KF
R702 10K
R703 10K
R704 10K
+3.3V
R691 6.8KF
R776 39KF
R777 10K
AIN0
C707 Z0.1u
CN610
THRM0
GND
LED
POUT
CTL
TO THERMISTOR & HAISHI SENSOR
D604
L639 1B601S
R694 56K
R693 5.6K
C708 K1000p
C771 NC
R688 330Ω
Q614
SENCTL0
TO HVPS
CN614
R769 2.2Ω (1W)
L644
DEV REM
CHG REM
LED
TRA CLK
DRUM
TOPCVR
REGIST
L645 0Ω
L646 0Ω
L647 0Ω
Q616
Q617
Q618
Q619
DEV
CHG
TRS
SENCTL1
L640 1B252SD
L641 1B252SD
L642 1B252SD
R725 10K
R726 1K
R722 39K
R721 2.7K
R737 33K
C741 K0.01u
R724 10K
C742 K1000p
C743 K1000p
TOPCVR
PICKUP
Q613
R689 4.7K(1/4W)
R690 10K
F604
Q615
TO PICK_UP
CN609
PICK
GND
D603
C773 NC
PG
TO LASER
CN613
R734 100Ω
R735 100Ω
R736 100Ω
APC
VIDEO
LDON
XHSYNC
XSHYNC
R733 10K
L643
C753 6.3V100
C754 Z0.1u
R687 100Ω
CN612
POLCLK
XREADY
POLON
C752 35V100
C755 Z0.1u
R731 0Ω
R732 0Ω
R720 4.7K
R723 100Ω
Q626
Q627
F605
TO POLYGON
IC610
C1ZBZ0001924
IC614 74SZ00
IC615 74SZ02
C763 Z0.1u
DMAACKO
DMAACKI
SRAS
SCAS
SWE
SCS
SDQML
SDQMU
SCLKE
SCLK
R675 22Ω
R676 22Ω
40MHz
64Mbit SDRAM
IC608
RA622 22Ω
RA623 22Ω
RA624 22Ω
RA625 22Ω
RA610
RA614
RA626
C671 Z0.1u
C672 J27p
C673 Z0.1u
C674 Z0.1u
C675 Z0.1u
C689 Z0.1u
C690 J27p
C687 J27p
C688 Z0.1u
R680 10K
R674 NC
R681 10K
R664 NC
R665 10K
R751 NC
R750 100Ω
R749 100Ω
R748 100Ω
R747 NC
C680 NC
C681 J15p
C682 J15p
R763 22Ω
R672 0Ω
R780
R781
R782
R783
R784
R785
R786
R787
IC604
MFC2000
XRESET
ALE
C699 Z0.1u
C698 Z0.1u
C705 Z0.1u
C719 Z0.1u
C720 Z0.1u
C717 Z0.1u
C738 Z0.1u
C740 Z0.1u
L678 1B252SD
L679 NC
PDET
POLCLK
FANDET1
FANDET2
FANON1
FANON2
CISPOS0
CISPOS1
JOG1
JOG2
SENCTL2
SENCTL3
SENCTL4
(1)(2)
(11)(12)
(10)
(7)(8)(9)(10)
(6)
(4)(5)
(a)
(b)(c)(d)
(e)(f)
(g)
(h)
(i)(j)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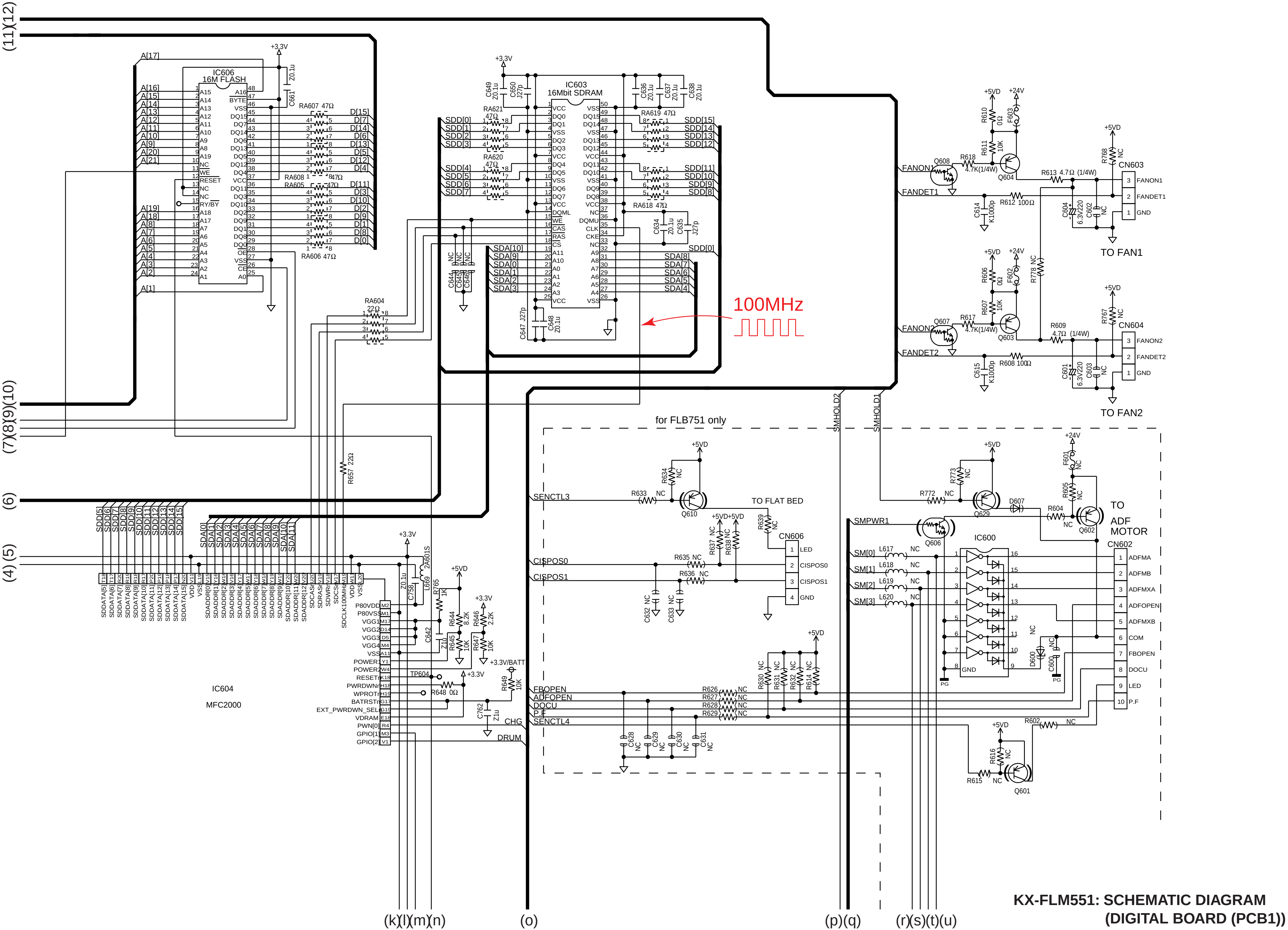
(6)
(4)(5)
IC606
16M FLASH
+3.3V
C661 Z0.1u
RA607 47Ω
RA608 47Ω
RA605 47Ω
RA606 47Ω
A[17]
A[16]
A[15]
A[14]
A[13]
A[12]
A[11]
A[10]
A[9]
A[20]
A[21]
A[19]
A[18]
A[8]
A[7]
A[6]
A[5]
A[4]
A[3]
A[2]
A[1]
D[15]
D[7]
D[14]
D[6]
D[13]
D[5]
D[12]
D[4]
D[11]
D[3]
D[10]
D[2]
D[9]
D[1]
D[8]
D[0]
IC603
16Mbit SDRAM
C649 Z0.1u
C650 J27p
C636 Z0.1u
C637 Z0.1u
C638 Z0.1u
RA621 47Ω
RA620 47Ω
RA619 47Ω
RA618 47Ω
C634 Z0.1u
C635 J27p
SDD[0]
SDD[1]
SDD[2]
SDD[3]
SDD[4]
SDD[5]
SDD[6]
SDD[7]
SDD[15]
SDD[14]
SDD[13]
SDD[12]
SDD[11]
SDD[10]
SDD[9]
SDD[8]
SDD[0]
SDA[10]
SDA[9]
SDA[0]
SDA[1]
SDA[2]
SDA[3]
SDA[8]
SDA[7]
SDA[6]
SDA[5]
SDA[4]
C644 NC
C645 NC
C646 NC
C647 J27p
C648 Z0.1u
RA604 22Ω
100MHz
R657 22Ω
FANON1
FANDET1
Q608
R618 4.7K(1/4W)
R611 10K
R610 0Ω
F603
+5VD
+24V
Q604
R613 4.7Ω (1/4W)
R768 NC
CN603
FANON1
FANDET1
GND
C614 K1000p
R612 100Ω
C604 6.3V220
C602 NC
TO FAN1
FANON2
FANDET2
Q607
R617 4.7K(1/4W)
R607 10K
R606 0Ω
F602
Q603
R778 NC
R609 4.7Ω (1/4W)
R767 NC
CN604
FANON2
FANDET2
GND
C615 K1000p
R608 100Ω
C601 6.3V220
C603 NC
TO FAN2
SMHOLD2
SMHOLD1
for FLB751 only
SENCTL3
R633 NC
R634 NC
Q610
TO FLAT BED
+5VD
R637 NC
R638 NC
R639 NC
CN606
LED
CISPOS0
CISPOS1
GND
CISPOS0
CISPOS1
R635 NC
R636 NC
C632 NC
C633 NC
R772 NC
R773 NC
Q629
D607
F601 NC
R605 NC
R604 NC
Q602
TO ADF MOTOR
SMPWR1
Q606
IC600
SM[0]
SM[1]
SM[2]
SM[3]
L617 NC
L618 NC
L619 NC
L620 NC
CN602
ADFMA
ADFMB
ADFMXA
ADFOPEN
ADFMXB
COM
FBOPEN
DOCU
LED
P.F
D600 NC
C600 NC
PG
GND
SDD[5]
SDD[6]
SDD[7]
SDD[8]
SDD[9]
SDD[10]
SDD[11]
SDD[12]
SDD[13]
SDD[14]
SDD[15]
SDA[0]
SDA[1]
SDA[2]
SDA[3]
SDA[4]
SDA[5]
SDA[6]
SDA[7]
SDA[8]
SDA[9]
SDA[10]
SDA[11]
IC604
MFC2000
P80VDD
P80VSS
VGG1
VGG2
VGG3
VGG4
VSS
POWER
POWER2
RESET
PWRDWN
WPROT
BATRST
EXT_PWRDWN_SEL
VDRAM
PWN[0]
GPIO[1]
GPIO[2]
L669 2A601S
C758 Z0.1u
R765 1K
R644 8.2K
R646 2.2K
R645 10K
R647 10K
C642 Z1u
TP604
R648 0Ω
+3.3V/BATT
R649 10K
C762 Z1u
CHG
DRUM
FBOPEN
ADFOPEN
DOCU
P.F
SENCTL4
R626 NC
R627 NC
R628 NC
R629 NC
R630 NC
R631 NC
R632 NC
R614 NC
C628 NC
C629 NC
C630 NC
C631 NC
R602 NC
R616 NC
R615 NC
Q601
(k)(l)(m)(n)
(o)
(p)(q)
(r)(s)(t)(u)

KX-FLM551: SCHEMATIC DIAGRAM (DIGITAL BOARD (PCB1))


(11)(12)
(7)(8)(9)(10)
(6)
(4)(5)
IC606
16M FLASH
+3.3V
A[17]
A[16]
A[15]
A[14]
A[13]
A[12]
A[11]
A[10]
A[9]
A[20]
A[21]
A[19]
A[18]
A[8]
A[7]
A[6]
A[5]
A[4]
A[3]
A[2]
A[1]
C661
Z0.1u
RA607 47Ω
RA608
RA605
RA606 47Ω
D[15]
D[7]
D[14]
D[6]
D[13]
D[5]
D[12]
D[4]
D[11]
D[3]
D[10]
D[2]
D[9]
D[1]
D[8]
D[0]
IC603
16Mbit SDRAM
C649
C650
C636
C637
C638
RA621 47Ω
RA620 47Ω
RA619 47Ω
RA618 47Ω
SDD[0]
SDD[1]
SDD[2]
SDD[3]
SDD[4]
SDD[5]
SDD[6]
SDD[7]
SDD[15]
SDD[14]
SDD[13]
SDD[12]
SDD[11]
SDD[10]
SDD[9]
SDD[8]
SDD[0]
SDA[10]
SDA[9]
SDA[0]
SDA[1]
SDA[2]
SDA[3]
SDA[8]
SDA[7]
SDA[6]
SDA[5]
SDA[4]
C634
C635
C644
C645
C646
C647 J27p
C648 Z0.1u
RA604 22Ω
100MHz
R657 22Ω
FANON1
FANDET1
Q608
R618 4.7K(1/4W)
R610 0Ω
F603
R611 10K
Q604
+5VD
+24V
R768 NC
CN603
FANON1
FANDET1
GND
R613 4.7Ω (1/4W)
C614 K1000p
R612 100Ω
C604 6.3V220
C602 NC
TO FAN1
R606 0Ω
F602
R607 10K
R778 NC
Q607
R617 4.7K(1/4W)
Q603
FANON2
FANDET2
R609 4.7Ω (1/4W)
R767 NC
CN604
FANON2
FANDET2
GND
C615 K1000p
R608 100Ω
C601 6.3V220
C603 NC
TO FAN2
SMHOLD2
SMHOLD1
for FLB751 only
SENCTL3
R633 NC
R634 NC
Q610
TO FLAT BED
+5VD+5VD
R637 NC
R638 NC
R639 NC
CN606
LED
CISPOS0
CISPOS1
GND
CISPOS0
CISPOS1
R635 NC
R636 NC
C632 NC
C633 NC
R772 NC
R773 NC
Q629
D607
F601 NC
R605 NC
R604 NC
Q602
TO
ADF
MOTOR
SMPWR1
Q606
IC600
SM[0]
SM[1]
SM[2]
SM[3]
L617 NC
L618 NC
L619 NC
L620 NC
CN602
ADFMA
ADFMB
ADFMXA
ADFOPEN
ADFMXB
COM
FBOPEN
DOCU
LED
P.F
D600
C600
PG
SDD[5]
SDD[6]
SDD[7]
SDD[8]
SDD[9]
SDD[10]
SDD[11]
SDD[12]
SDD[13]
SDD[14]
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SDA[11]
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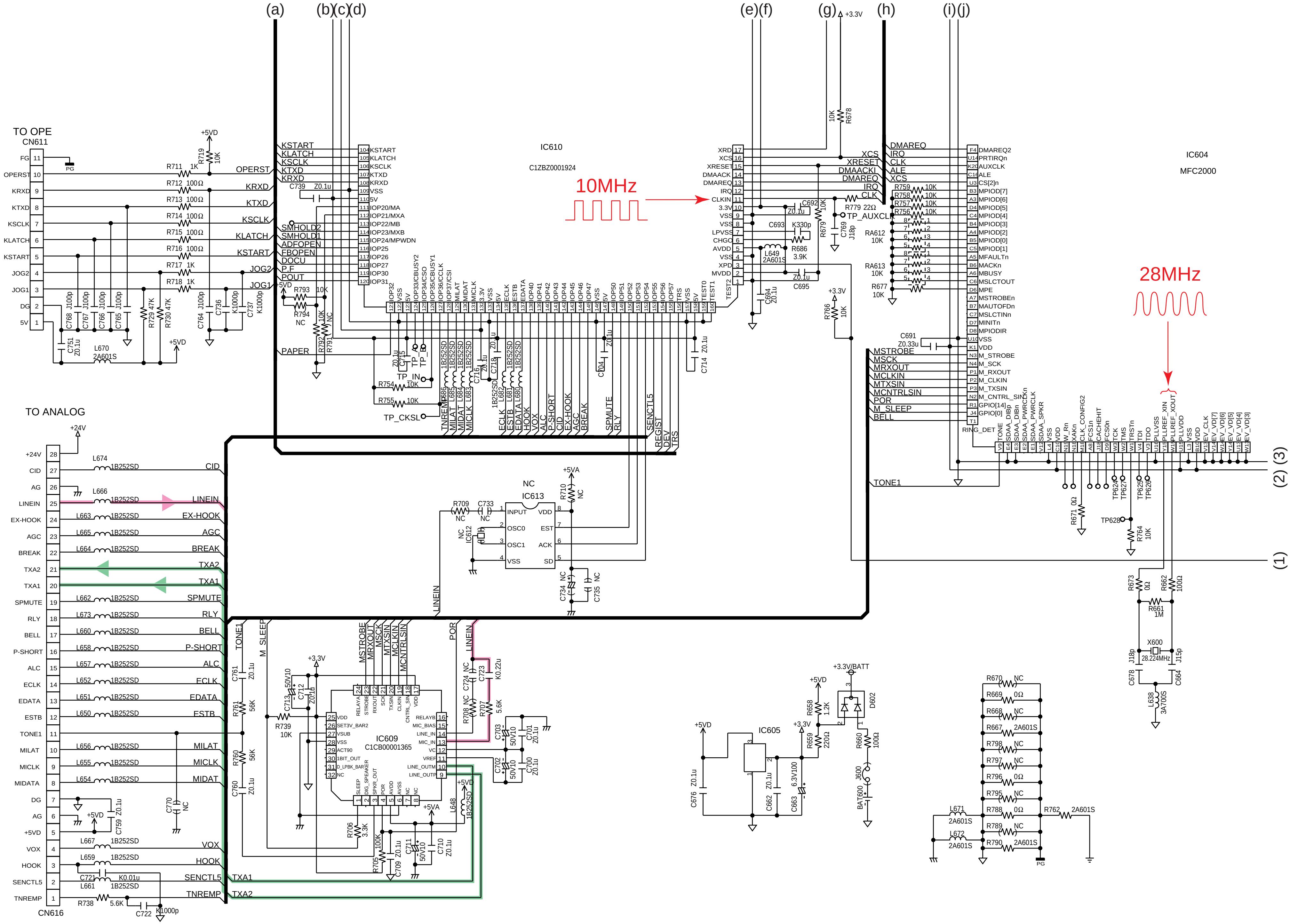
SDADDR[11]
SDCAS
SDRAS
SDWR
SDCS
SDCLK100MHz
VDD
VSS
IC604
MFC2000
P80VDD
P80VSS
VGG1
VGG2
VGG3
VGG4
VSS
POWER1
POWER2
RESET
PWRDWN
WPROT
BATRST
EXT_PWRDWN_SEL
VDRAM
PWN[0]
GPIO[1]
GPIO[2]
C758 Z0.1u
L669 2A601S
R765 1K
R644 8.2K
R645 10K
R646 2.2K
R647 10K
C642 Z1u
TP604
R648 0Ω
+3.3V/BATT
R649 10K
C762 Z1u
CHG
DRUM
FBOPEN
ADFOPEN
DOCU
P.F
SENCTL4
R626 NC
R627 NC
R628 NC
R629 NC
R630 NC
R631 NC
R632 NC
R614 NC
C628 NC
C629 NC
C630 NC
C631 NC
R602 NC
R616 NC
R615 NC
Q601
(k)(l)(m)(n)
(o)
(p)(q)
(r)(s)(t)(u)

KX-FLM551: SCHEMATIC DIAGRAM
(DIGITAL BOARD (PCB1))


(a)
(b)(c)(d)
(e)(f)
(g)
+3.3V
(h)
(i)(j)
TO OPE
CN611
FG
OPERST
KRXD
KTXD
KSCLK
KLATCH
KSTART
JOG2
JOG1
DG
5V
PG
+5VD
R719 10K
R711 1K
R712 100Ω
R713 100Ω
R714 100Ω
R715 100Ω
R716 100Ω
R717 1K
R718 1K
C768 J100p
C767 J100p
C766 J100p
C765 J100p
R729 47K
R730 47K
C764 J100p
C736 K1000p
C737 K1000p
C751 Z0.1u
L670 2A601S
C739 Z0.1u
KSTART
KLATCH
KSCLK
KTXD
KRXD
SMHOLD2
SMHOLD1
ADFOPEN
FBOPEN
DOCU
P.F
POUT
PAPER
R793 10K
R794 NC
R792 10K
R791 NC
IC610
C1ZBZ0001924
10MHz
IOP20/MA
IOP21/MXA
IOP22/MB
IOP23/MXB
IOP24/MPWDN
IOP25
IOP26
IOP27
IOP30
IOP31
XRD
XCS
XRESET
DMAACK
DMAREQ
IRQ
CLKIN
3.3V
VSS
LPVSS
CHGO
AVDD
XPD
MVDD
TEST2
TEST1
TEST0
C692 Z0.1u
C693 K330p
R686 3.9K
L649 2A601S
R679 10K
C694 Z0.1u
C695 Z0.1u
C769 J18p
R779 22Ω
TP_AUXCLK
R678 10K
R766 10K
C691 Z0.33u
TP_IN
TP_CKSL
R754 10K
R755 10K
C715 Z0.1u
C716 Z0.1u
C718 Z0.1u
C704 Z0.1u
C714 Z0.1u
TNREMP
MILAT
MIDAT
MICLK
ECLK
ESTB
EDATA
HOOK
VOX
ALC
P_SHORT
CID
EX-HOOK
AGC
BREAK
SPMUTE
RLY
SENCTL5
REGIST
DEV
TRS
DMAREQ
IRQ
CLK
ALE
XCS
XRESET
DMAACK
IC604
MFC2000
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PRTIRQn
AUXCLK
ALE
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MFAULTn
MACKn
MBUSY
MSLCTOUT
MPE
MSTROBEn
MAUTOFDn
MSLCTINn
MINITn
MPIODIR
VSS
VDD
M_STROBE
M_SCK
M_RXOUT
M_CLKIN
M_TXSIN
M_CNTRL_SIN
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RING_DET
R759 10K
R758 10K
R757 10K
R756 10K
RA612 10K
RA613 10K
R677 10K
MSTROBE
MSCK
MRXOUT
MCLKIN
MTXSIN
MCNTRLSIN
POR
M_SLEEP
BELL
TONE1
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TP627
TP625
TP626
TP628
R671 0Ω
R764 10K
R673 0Ω
R662 100Ω
R661 1M
X600 28.224MHz
C678 J18p
C664 J15p
L638 3A700S
(1)
(2)
(3)
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R709 NC
C733 NC
R710 NC
INPUT
OSC0
OSC1
VSS
VDD
EST
ACK
SD
IC612 NC
C734 NC
C735 NC
LINEIN
TO ANALOG
+24V
CN616
CID
AG
LINEIN
EX-HOOK
AGC
BREAK
TXA2
TXA1
SPMUTE
RLY
BELL
P-SHORT
ALC
ECLK
EDATA
ESTB
TONE1
MILAT
MICLK
MIDAT
DG
AG
+5VD
VOX
HOOK
SENCTL5
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L673 1B252SD
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L667 1B252SD
L659 1B252SD
L661 1B252SD
C721 K0.01u
R738 5.6K
C722 K1000p
C759 Z0.1u
C770 NC
TONE1
M_SLEEP
C761 Z0.1u
R761 56K
R760 56K
C760 Z0.1u
R739 10K
C713 50V10
C712 Z0.1u
+3.3V
IC609
C1CB00001365
RELAYA
STROBE
RXOUT
SCK
TXSIN
CLKIN
CNTRL_SIN
VDD
SET3V_BAR2
VSUB
ACT90
1BIT_OUT
D_LPBK_BAR
RELAYB
MIC_BIAS
LINE_IN
MIC_IN
VC
VREF
LINE_OUTM
LINE_OUTP
SLEEP
DIG_SPEAKER
SPKR_OUT
AVDD
AVSS
R708 NC
C724 NC
C723 K0.22u
R707 5.6K
C703 50V10
C701 Z0.1u
C702 50V10
C700 Z0.1u
L648 1B252SD
+5VD
+5VA
R706 3.3K
R705 100K
C709 Z0.1u
C711 50V10
C710 Z0.1u
TXA1
TXA2
IC605
C676 Z0.1u
C662 Z0.1u
C663 6.3V100
R658 1.2K
R659 220Ω
+3.3V/BATT
D602
R660 100Ω
J600
BAT600
R670 NC
R669 0Ω
R668 NC
R667 2A601S
R798 NC
R797 NC
R796 0Ω
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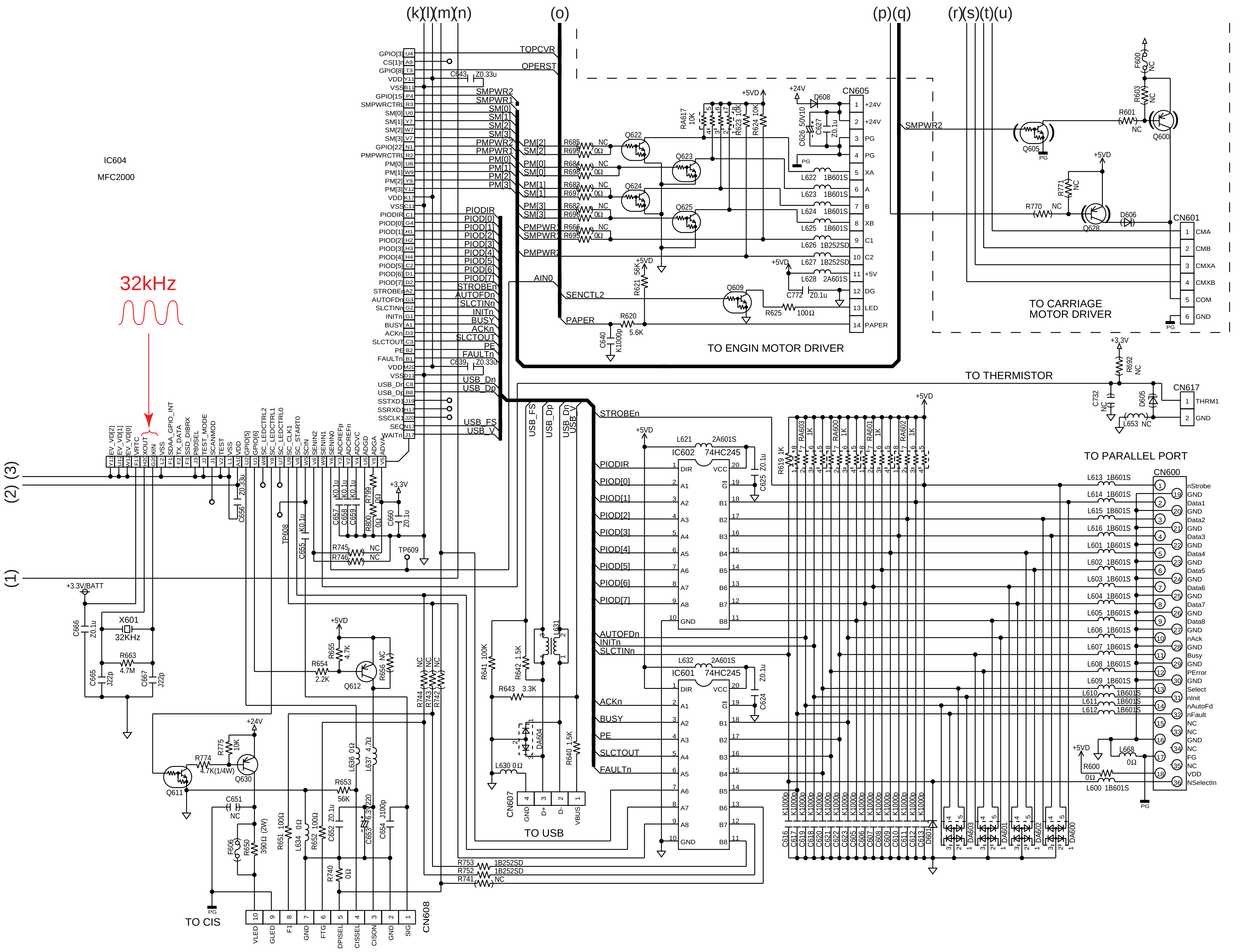
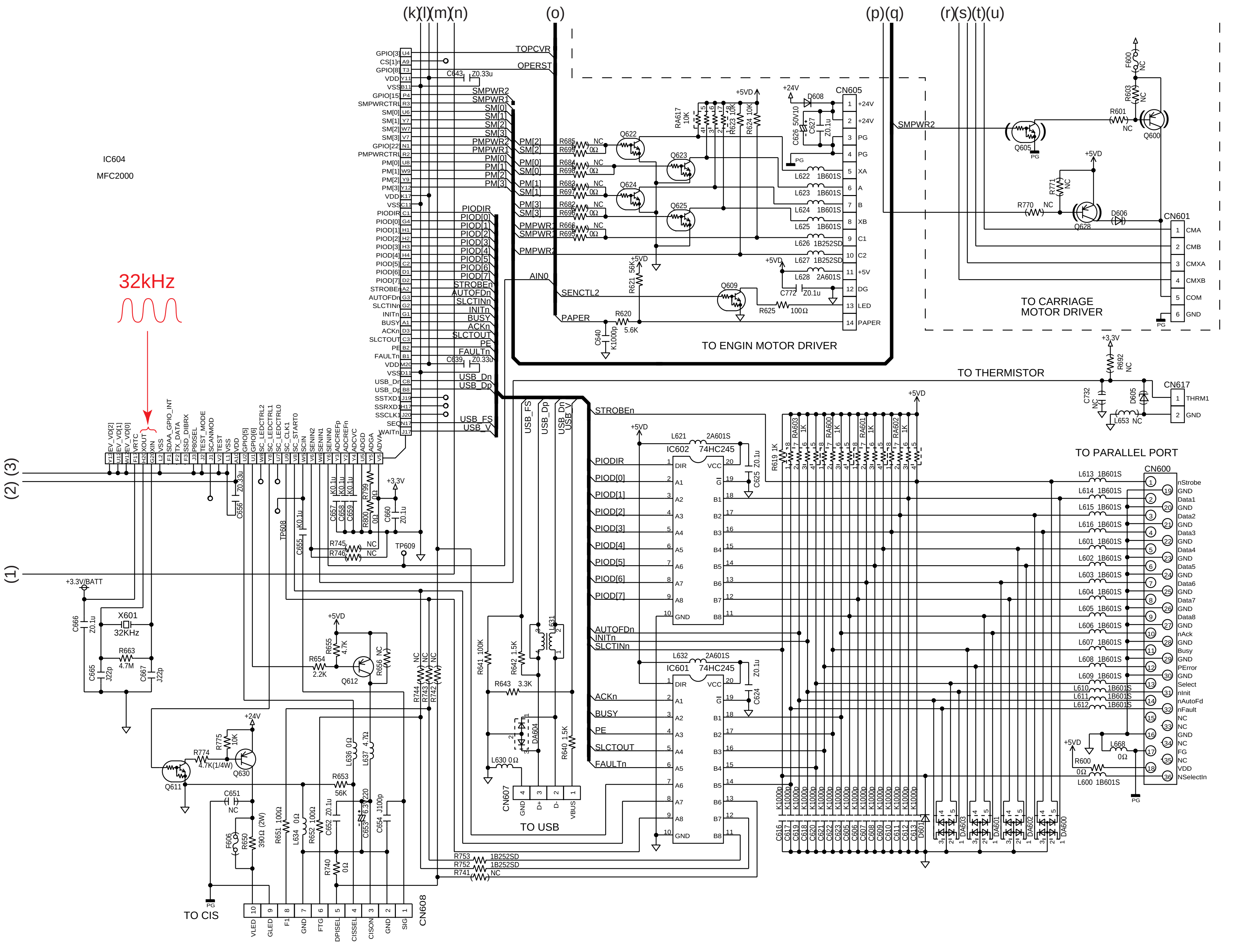
R789 NC
R790 2A601S
R762 2A601S
L671 2A601S
L672 2A601S
PG

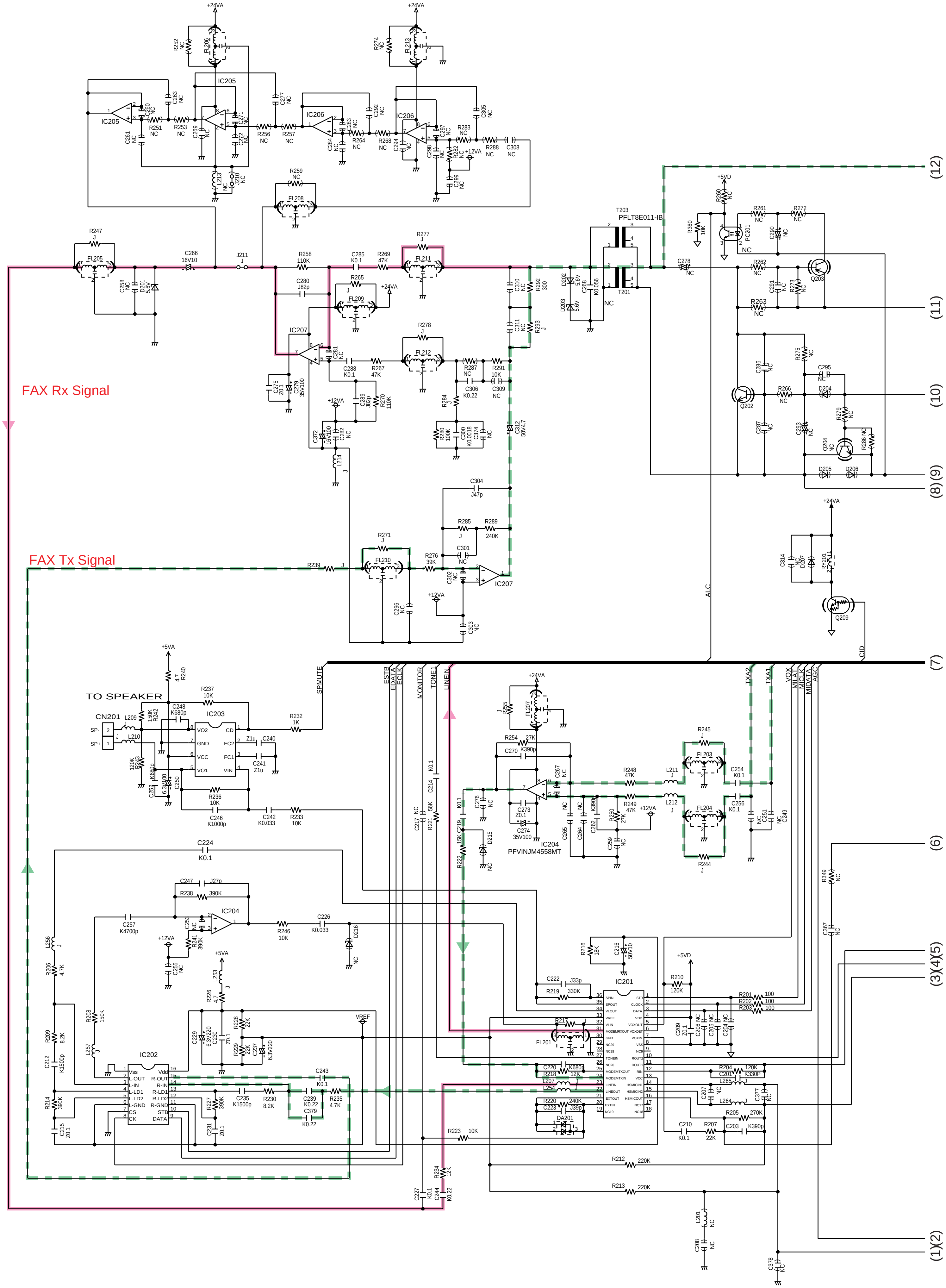


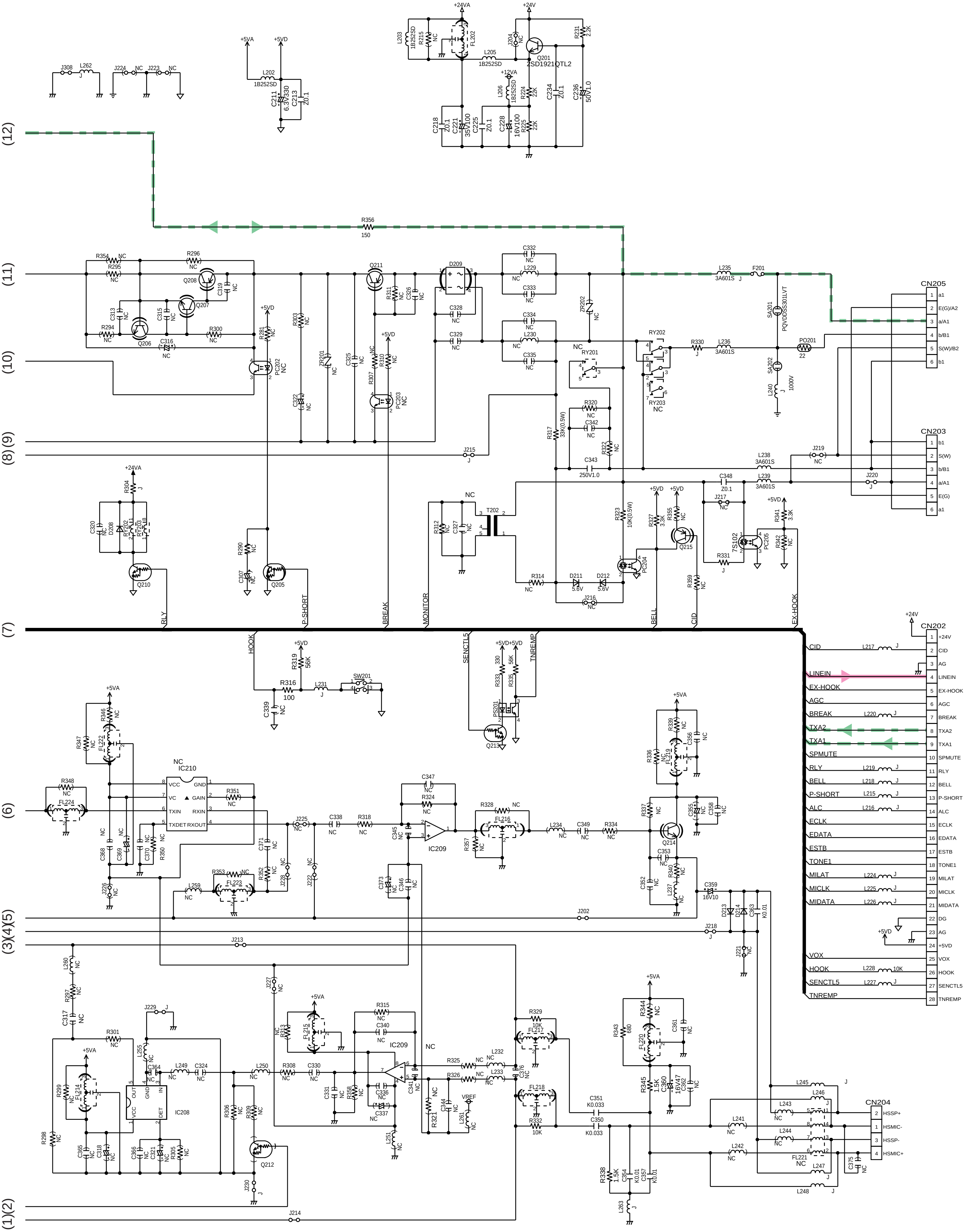
(k)(l)(m)(n)
(o)
(p)(q)
(r)(s)(t)(u)
IC604
MFC2000
32kHz
X601
32KHz
(1)
(2) (3)
+3.3V/BATT
TOPCVR
OPERST
SMPWR2
SMPWR1
PIODIR
AIN0
SENCTL2
PAPER
CN605
TO ENGIN MOTOR DRIVER
Q622
Q623
Q624
Q625
Q609
Q605
Q600
Q628
CN601
CMA
CMB
CMXA
CMXB
COM
GND
TO CARRIAGE MOTOR DRIVER
TO THERMISTOR
CN617
THRM1
IC602 74HC245
IC601 74HC245
STROBEn
AUTOFDn
INITn
SLCTINn
ACKn
BUSY
PE
SLCTOUT
FAULTn
USB_FS
USB_Dp
USB_Dn
USB_V
CN607
TO USB
TO PARALLEL PORT
CN600
nStrobe
Data1
Data2
Data3
Data4
Data5
Data6
Data7
Data8
nAck
Busy
PError
Select
nInit
nAutoFd
nFault
NC
FG
VDD
NSelectIn
Q611
Q612
Q630
CN608
TO CIS
VLED
GLED
F1
GND
FTG
DPISEL
CISSEL
CISON
SIG

KX-FLM551: SCHEMATIC DIAGRAM (DIGITAL BOARD (PCB1))


(k)(l)(m)(n)
(o)
(p)(q)
(r)(s)(t)(u)
IC604
MFC2000
32kHz
TOPCVR
OPERST
SMPWR2
SMPWR1
PIODIR
PIOD[0]
STROBEn
AUTOFDn
SLCTINn
INITn
BUSY
ACKn
SLCTOUT
PE
FAULTn
USB_Dn
USB_Dp
USB_FS
USB_V
AIN0
SENCTL2
PAPER
CN605
+24V
PG
XA
A
B
XB
C1
C2
+5V
DG
LED
TO ENGIN MOTOR DRIVER
Q622
Q623
Q624
Q625
Q609
CN601
CMA
CMB
CMXA
CMXB
COM
GND
TO CARRIAGE
MOTOR DRIVER
Q600
Q605
Q628
TO THERMISTOR
CN617
THRM1
TO PARALLEL PORT
CN600
nStrobe
Data1
Data2
Data3
Data4
Data5
Data6
Data7
Data8
nAck
Busy
PError
Select
nInit
nAutoFd
nFault
NC
FG
VDD
NSelectIn
IC602 74HC245
IC601 74HC245
DIR
VCC
A1
B1
CN607
GND
D+
D-
VBUS
TO USB
DA604
X601
32KHz
Q612
Q611
Q630
CN608
VLED
GLED
F1
FTG
DPISEL
CISSEL
CISON
SIG
TO CIS
(1)
(2) (3)
+3.3V/BATT
TP608
TP609

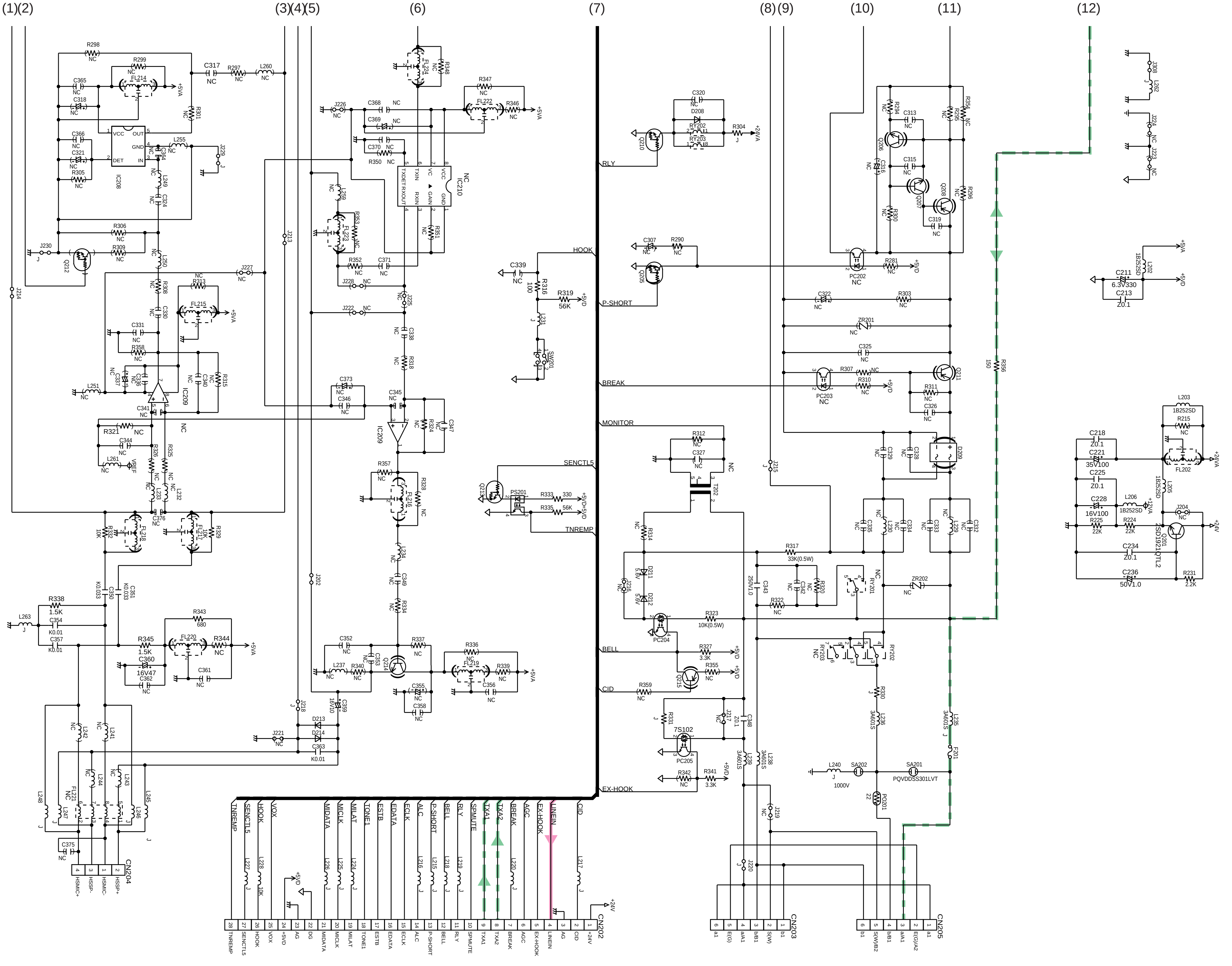
KX-FLM551: SCHEMATIC DIAGRAM (DIGITAL BOARD (PCB1))

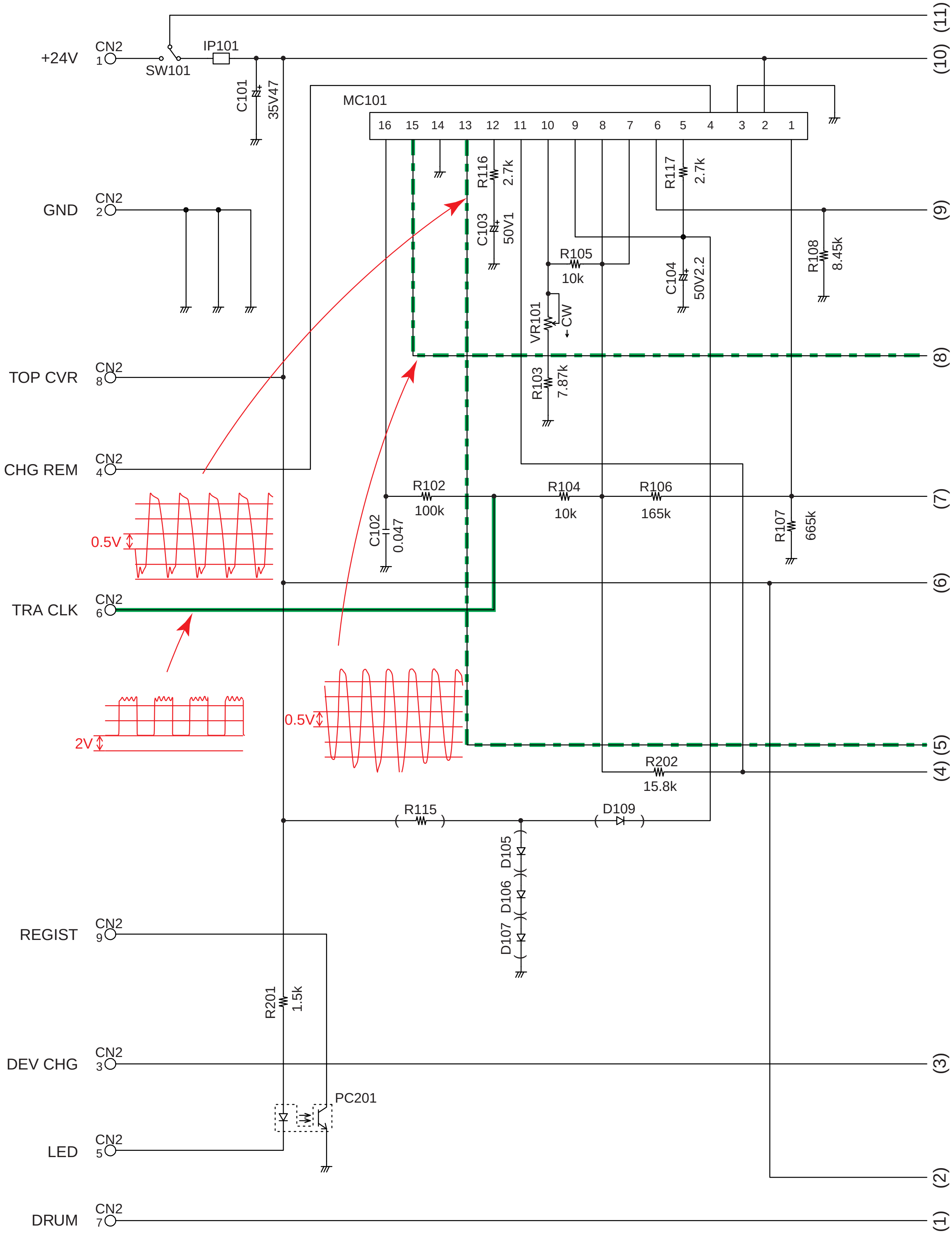

FAX Rx Signal
FAX Tx Signal
TO SPEAKER
CN201
SP-
SP+
IC201
IC202
IC203
IC204
IC205
IC206
IC207
PFVINJM4558MT
T203
PFLT8E011-IB
T201
PC201
Q202
Q203
Q204
Q209
RY201
FL201
FL203
FL204
FL205
FL206
FL207
FL208
FL209
FL210
FL211
FL212
FL213
DA201
+24VA
+12VA
+5VA
+5VD
VREF
ALC
CID
SPMUTE
ESTB
EDATA
ECLK
MONITOR
TONE1
LINEIN
TXA2
TXA1
VOX
MILAT
MICLK
MIDATA
AGC
(1)(2)
(3)(4)(5)
(6)
(7)
(8)(9)
(10)
(11)
(12)

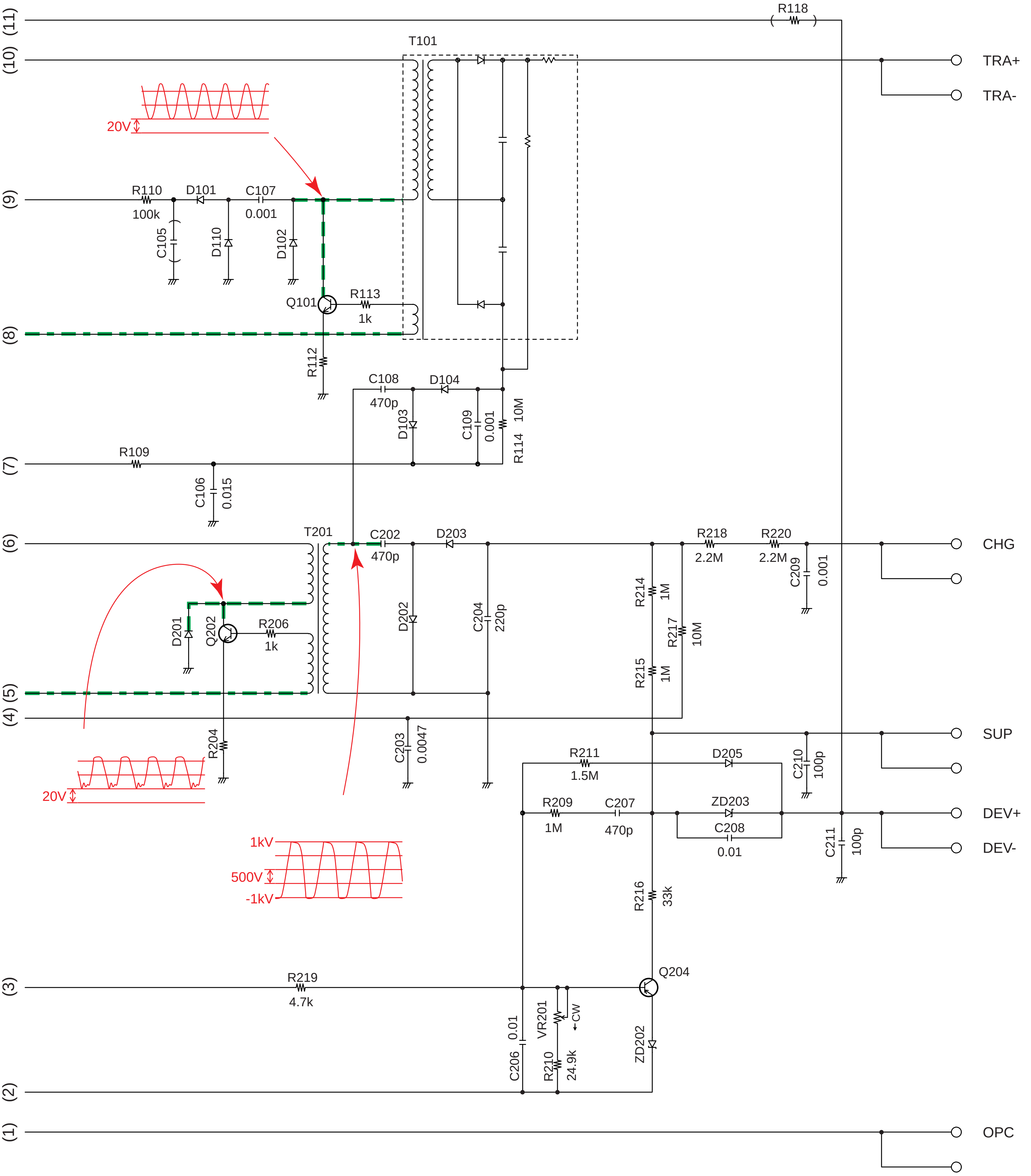

(12)
(11)
(10)
(9)
(8)
(7)
(6)
(5)
(4)
(3)
(2)
(1)
+24VA
+24V
+5VA
+5VD
+12VA
L202
1B252SD
C211
6.3V330
C213
Z0.1
L203
1B252SD
R215
NC
FL202
L205
1B252SD
J204
NC
Q201
2SD1921QTL2
R231
2.2K
L206
1B252SD
R224
22K
C234
Z0.1
C236
50V1.0
C218
Z0.1
C221
35V100
C225
Z0.1
C228
16V100
R225
22K
J308
L262
J224
J223
R356
150
R354
R295
R296
Q208
Q207
C319
C313
C315
R294
Q206
C316
R300
R281
PC202
R303
ZR201
C325
R307
R310
Q211
R311
C326
PC203
C322
D209
C328
C329
C332
L229
C333
C334
L230
C335
ZR202
RY201
RY202
RY203
R320
C342
R317
33K(0.5W)
R322
C343
250V1.0
L235
3A601S
F201
SA201
PQVDDSS301LVT
R330
L236
3A601S
PO201
22
SA202
L240
1000V
CN205
a1
E(G)/A2
a/A1
b/B1
S(W)/B2
b1
CN203
b1
S(W)
b/B1
a/A1
E(G)
a1
J215
J219
L238
3A601S
L239
3A601S
C348
Z0.1
J220
J217
T202
R312
C327
R323
10K(0.5W)
R327
3.3K
R355
Q215
7S102
PC205
R341
3.3K
R342
R331
PC204
R314
D211
5.6V
D212
5.6V
J216
R359
C320
D208
RY202
RY203
R304
Q210
R290
C307
Q205
RLY
P-SHORT
BREAK
MONITOR
BELL
CID
EX-HOOK
HOOK
SENCTL5
TNREMP
R319
56K
R316
100
L231
SW201
C339
R333
330
R335
56K
PS201
Q213
CN202
+24V
CID
AG
LINEIN
EX-HOOK
AGC
BREAK
TXA2
TXA1
SPMUTE
RLY
BELL
P-SHORT
ALC
ECLK
EDATA
ESTB
TONE1
MILAT
MICLK
MIDATA
DG
AG
+5VD
VOX
HOOK
SENCTL5
TNREMP
L217
L220
L219
L218
L215
L216
L224
L225
L226
L228
10K
L227
R346
R347
FL222
R348
FL224
IC210
VCC
GND
VC
GAIN
TXIN
RXIN
TXDET
RXOUT
R351
C368
C369
C370
R350
C371
J226
L259
R353
FL223
R352
J228
J225
C338
R318
J222
C347
R324
IC209
C345
R357
C373
C346
R328
FL216
L234
C349
R334
R339
R336
FL219
C356
R337
C355
C358
Q214
C353
R340
C352
L237
C359
16V10
D213
D214
C363
K0.01
J221
J202
J218
J213
L260
R297
C317
R301
J229
L255
C364
L249
C324
R299
FL214
IC208
OUT
GND
IN
VCC
DET
R298
C365
C318
C366
C321
R305
J227
R313
FL215
R315
C340
IC209
L250
R308
C330
C331
R358
C336
C337
L251
R306
R309
Q212
J230
J214
R325
L232
R326
L233
C376
C341
R321
C344
VREF
L261
R329
10K
FL217
FL218
R332
10K
C351
K0.033
C350
K0.033
R344
R343
680
FL220
C361
R345
1.5K
C360
16V47
C362
R338
1.5K
C354
K0.01
C357
K0.01
L263
L245
L246
L243
L241
L244
L242
FL221
L247
L248
C375
CN204
HSSP+
HSMIC-
HSSP-
HSMIC+

KX-FLM551: SCHEMATIC DIAGRAM (ANALOG BOARD (PCB2))

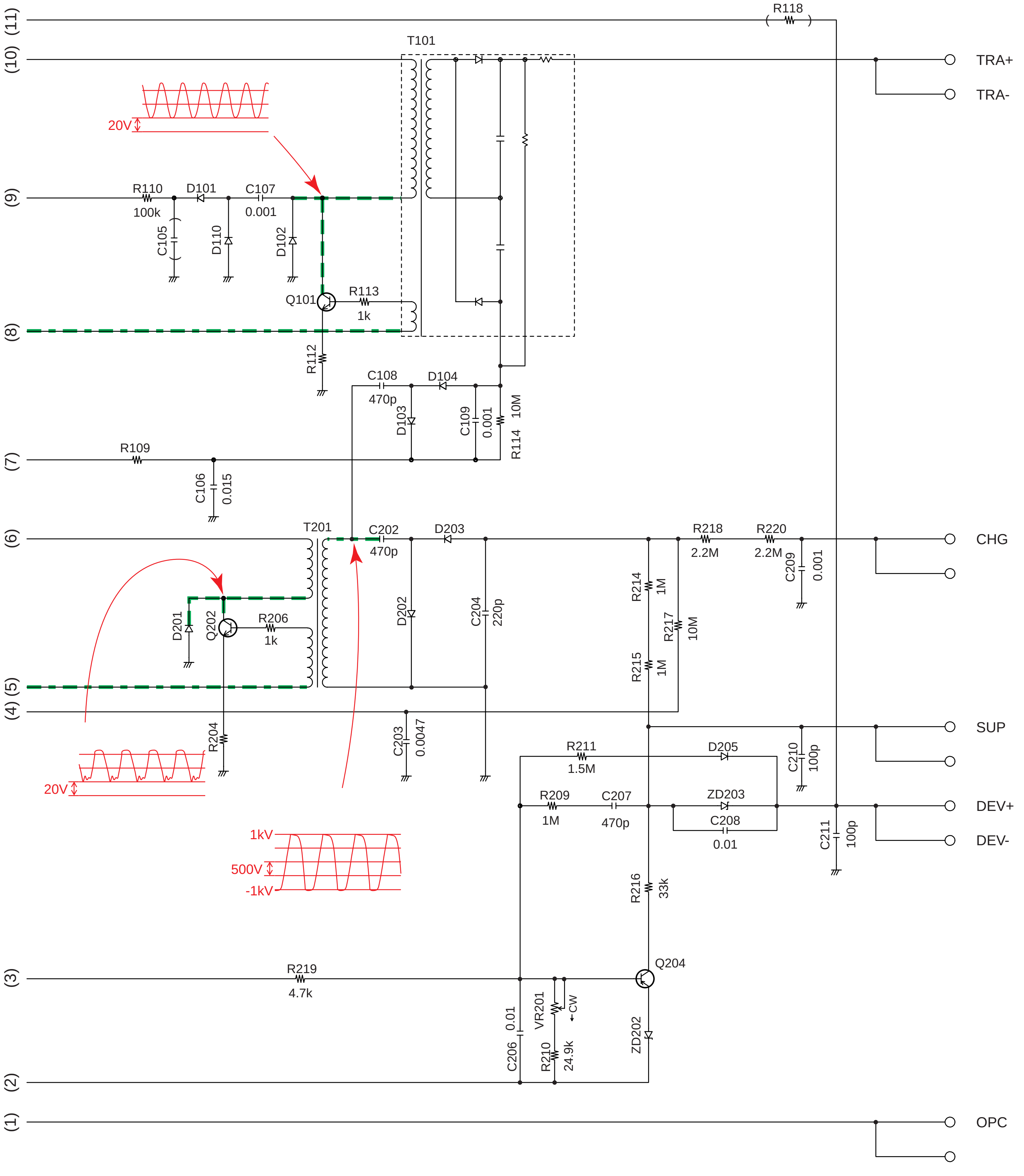
KX-FLM551: SCHEMATIC DIAGRAM (ANALOG BOARD (PCB2))


(1)(2)
(3)(4)(5)
(6)
(7)
(8)(9)
(10)
(11)
(12)
IC208
IC209
IC210
RLY
HOOK
P-SHORT
BREAK
MONITOR
SENCTL5
TNREMP
BELL
CID
EX-HOOK
+5VA
+5VD
+24VA
+24V
+12VA
VREF
Q205
Q206
Q207
Q208
Q210
Q211
Q212
Q213
Q214
Q215
Q201 2SD1921QTL2
PC202
PC203
PC204
PC205
PS201
T202
RY201
RY202
RY203
D209
SA201 PQVDDSS301LVT
SA202
PO201
F201
CN202
1 +24V
2 CID
3 AG
4 LINEIN
5 EX-HOOK
6 AGC
7 BREAK
8 TXA2
9 TXA1
10 SPMUTE
11 RLY
12 BELL
13 P-SHORT
14 ALC
15 ECLK
16 EDATA
17 ESTB
18 TONE1
19 MILAT
20 MICLK
21 MIDATA
22 DG
23 AG
24 +5VD
25 VOX
26 HOOK
27 SENCTL5
28 TNREMP
CN203
1 b1
2 S(W)
3 bB1
4 aA1
5 E(G)
6 a1
CN204
1 HSSP+
2 HSMIC-
3 HSSP-
4 HSMIC+
CN205
1 a1
2 E(G)/A2
3 aA1
4 bB1
5 S(W)/B2
6 b1

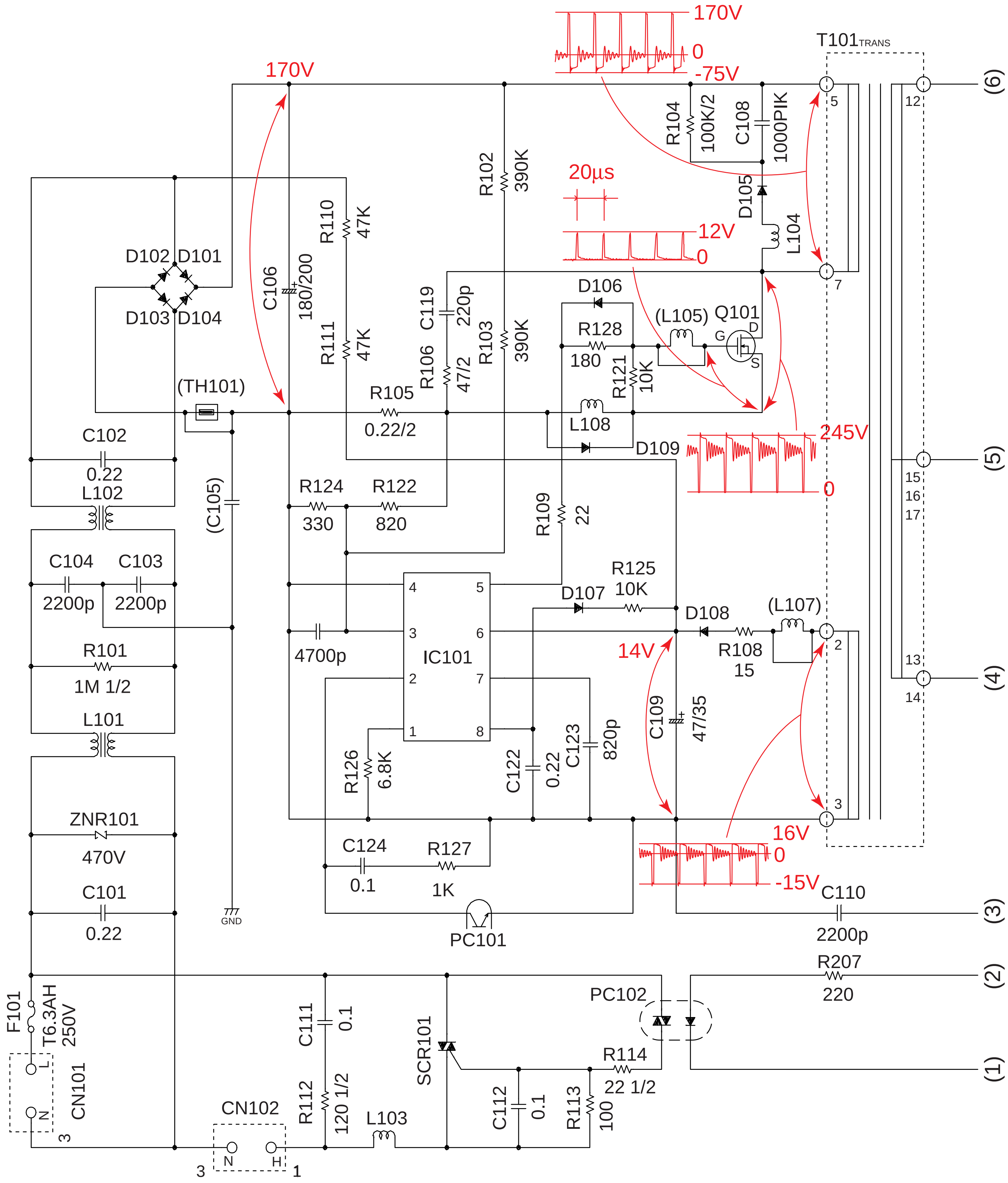

+24V
CN2 1
SW101
IP101
C101
35V47
MC101
16 15 14 13 12 11 10 9 8 7 6 5 4 3 2 1
GND
CN2 2
R116
2.7k
C103
50V1
R117
2.7k
R105
10k
C104
50V2.2
R108
8.45k
VR101
CW
TOP CVR
CN2 8
R103
7.87k
CHG REM
CN2 4
R102
100k
R104
10k
R106
165k
C102
0.047
R107
665k
0.5V
TRA CLK
CN2 6
2V
0.5V
R202
15.8k
R115
D109
D105
D106
D107
REGIST
CN2 9
R201
1.5k
DEV CHG
CN2 3
PC201
LED
CN2 5
DRUM
CN2 7
(11)
(10)
(9)
(8)
(7)
(6)
(5)
(4)
(3)
(2)
(1)


(11)
(10)
(9)
(8)
(7)
(6)
(4) (5)
(3)
(2)
(1)
R118
T101
TRA+
TRA-
20V
R110
100k
D101
C107
0.001
C105
D110
D102
Q101
R113
1k
R112
C108
470p
D104
D103
C109
0.001
10M
R114
R109
C106
0.015
T201
C202
470p
D203
R218
2.2M
R220
2.2M
C209
0.001
CHG
D202
C204
220p
R214
1M
R217
10M
R215
1M
D201
Q202
R206
1k
R204
20V
C203
0.0047
SUP
R211
1.5M
D205
C210
100p
R209
1M
C207
470p
ZD203
C208
0.01
DEV+
DEV-
C211
100p
1kV
500V
-1kV
R216
33k
Q204
R219
4.7k
0.01
C206
VR201
CW
R210
24.9k
ZD202
OPC

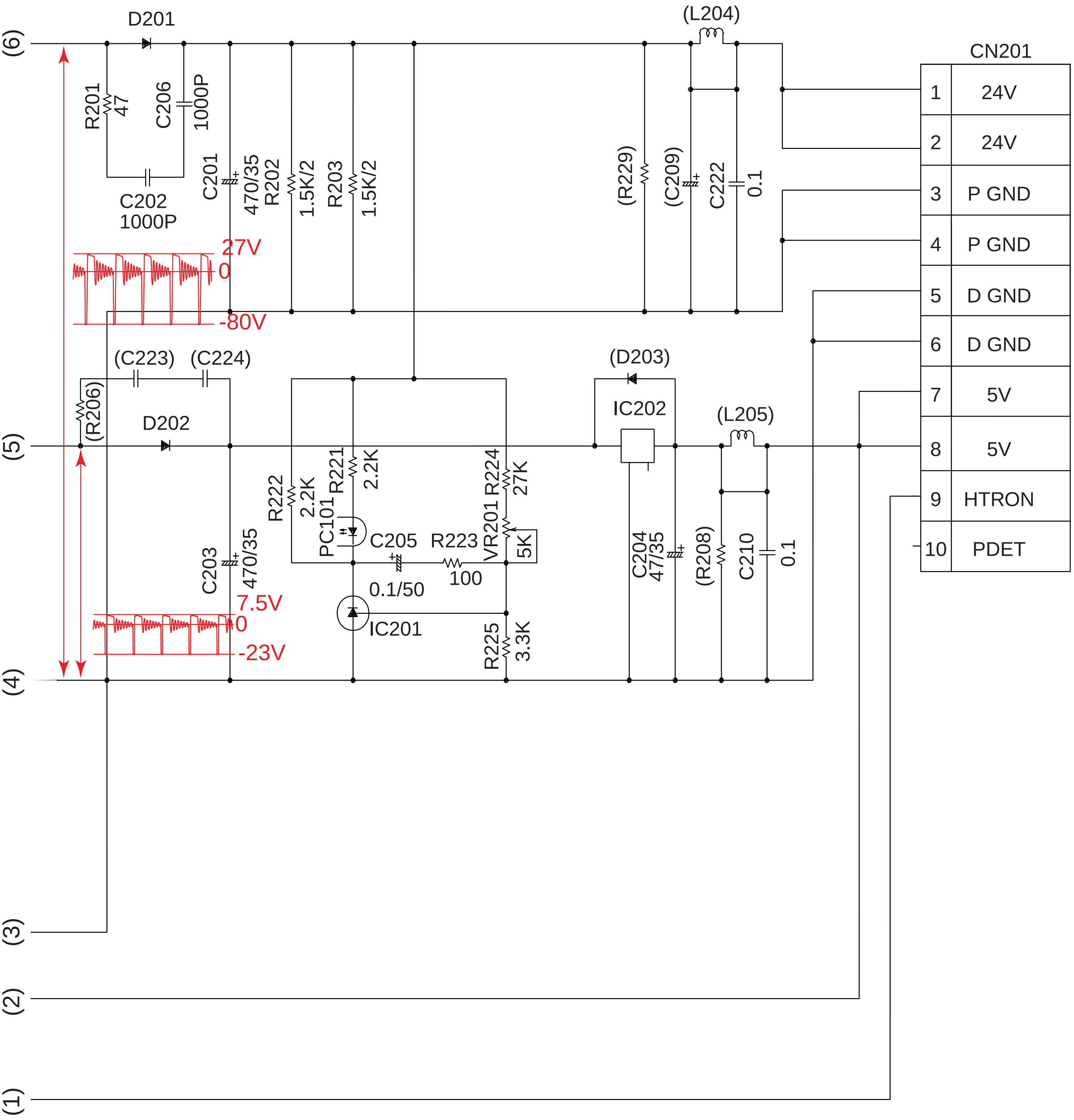
KX-FLM551: SCHEMATIC DIAGRAM (HIGH VOLTAGE POWER SUPPLY BOARD (PCB4))


(11)
(10)
(9)
(8)
(7)
(6)
(4) (5)
(3)
(2)
(1)
R118
T101
TRA+
TRA-
20V
R110
100k
D101
C107
0.001
C105
D110
D102
Q101
R113
1k
R112
C108
470p
D104
D103
C109
0.001
10M
R114
R109
C106
0.015
T201
C202
470p
D203
D201
Q202
R206
1k
D202
C204
220p
R218
2.2M
R220
2.2M
C209
0.001
CHG
R214
1M
R217
10M
R215
1M
20V
R204
C203
0.0047
SUP
R211
1.5M
D205
C210
100p
R209
1M
C207
470p
ZD203
C208
0.01
DEV+
DEV-
C211
100p
1kV
500V
-1kV
R216
33k
Q204
R219
4.7k
0.01
C206
VR201
CW
R210
24.9k
ZD202
OPC

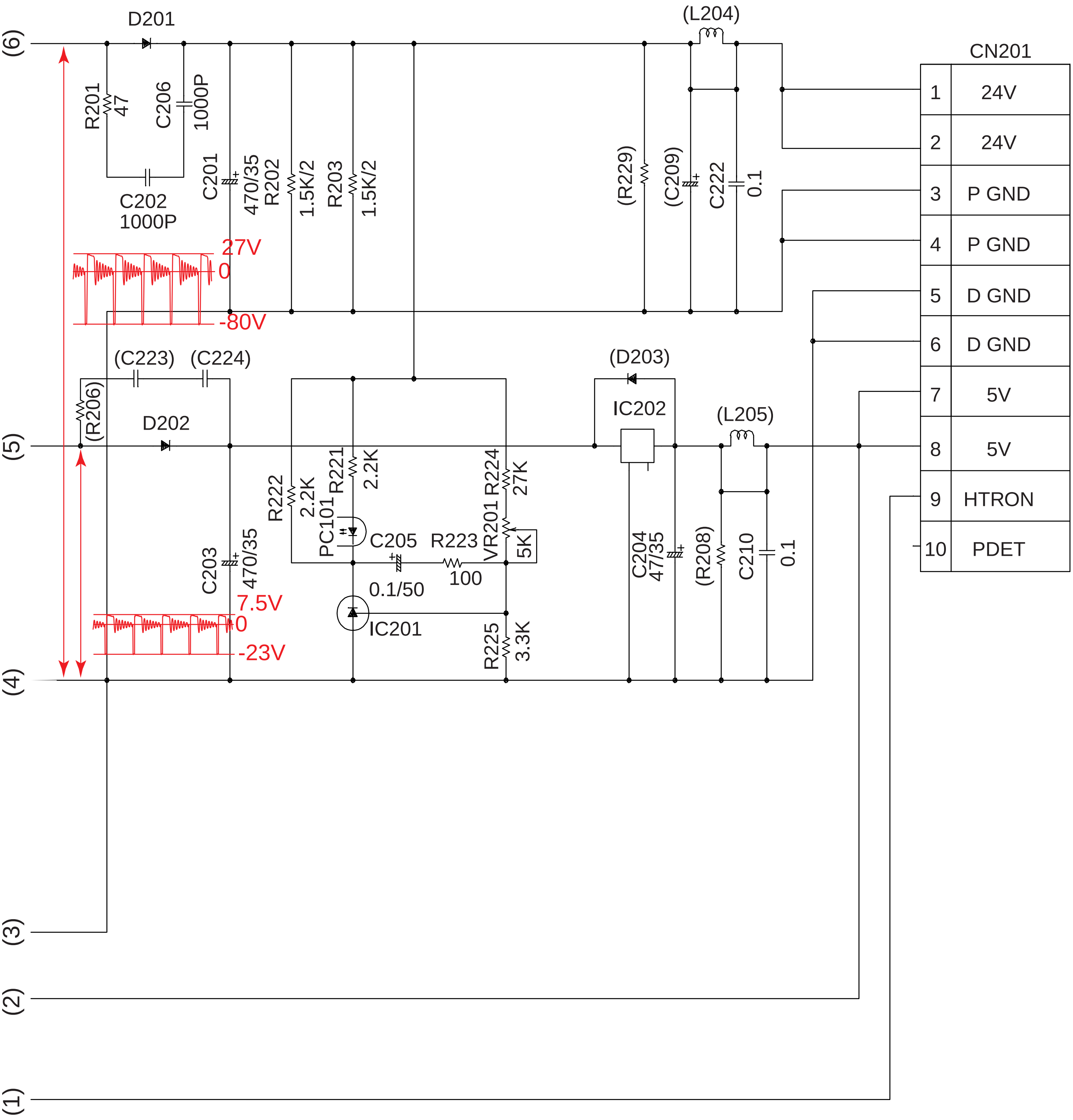
KX-FLM551: SCHEMATIC DIAGRAM (HIGH VOLTAGE POWER SUPPLY BOARD (PCB4))



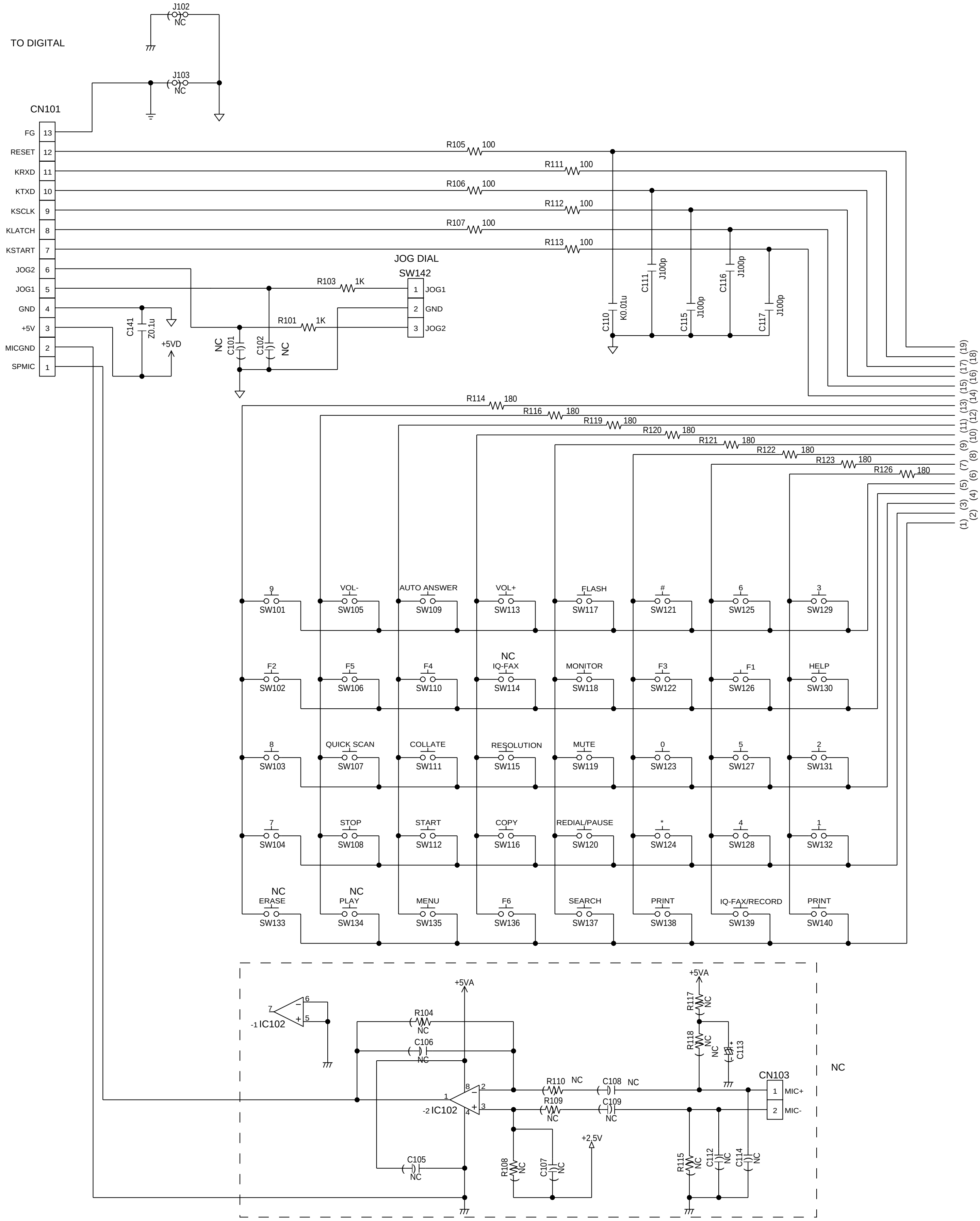
170V
0
-75V
T101TRANS
170V
20µs
12V
0
245V
0
14V
16V
0
-15V
R104
100K/2
C108
1000PIK
D105
L104
R102
390K
R103
390K
R110
47K
R111
47K
C106
180/200
C119
220p
R106
47/2
D102
D101
D103
D104
(TH101)
R105
0.22/2
D106
R128
180
R121
10K
(L105)
Q101
G
D
S
L108
D109
C102
0.22
L102
(C105)
R124
330
R122
820
R109
22
C104
2200p
C103
2200p
R101
1M 1/2
L101
IC101
4
5
3
6
2
7
1
8
4700p
R125
10K
D107
D108
(L107)
R108
15
C109
47/35
R126
6.8K
C122
0.22
C123
820p
ZNR101
470V
C101
0.22
GND
C124
0.1
R127
1K
PC101
C110
2200p
R207
220
PC102
F101
T6.3AH
250V
CN101
L
N
3
C111
0.1
R112
120 1/2
SCR101
L103
CN102
N
H
3
1
C112
0.1
R113
100
R114
22 1/2
5
7
12
15
16
17
13
14
2
3
(6)
(5)
(4)
(3)
(2)
(1)

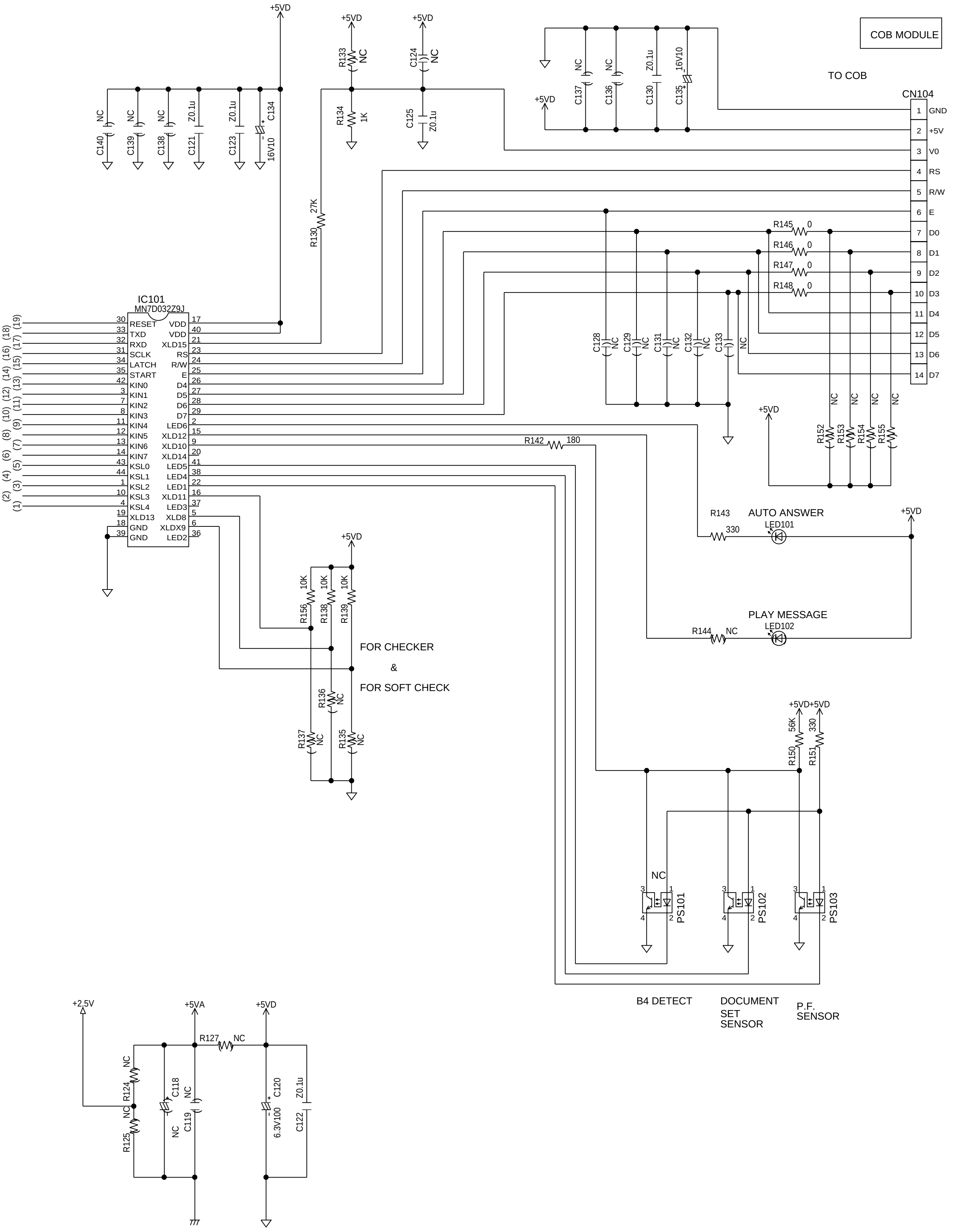

(6)
(5)
(4)
(3)
(2)
(1)
D201
R201
47
C206
1000P
C202
1000P
C201
470/35
R202
1.5K/2
R203
1.5K/2
27V
0
-80V
(L204)
(R229)
(C209)
C222
0.1
CN201
1 24V
2 24V
3 P GND
4 P GND
5 D GND
6 D GND
7 5V
8 5V
9 HTRON
10 PDET
(C223)
(C224)
(R206)
D202
R222
2.2K
R221
2.2K
PC101
C205
0.1/50
R223
100
VR201
5K
R224
27K
IC201
R225
3.3K
C203
470/35
7.5V
0
-23V
(D203)
IC202
C204
47/35
(L205)
(R208)
C210
0.1

KX-FLM551: SCHEMATIC DIAGRAM (LOW VOLTAGE POWER SUPPLY BOARD (PCB5))

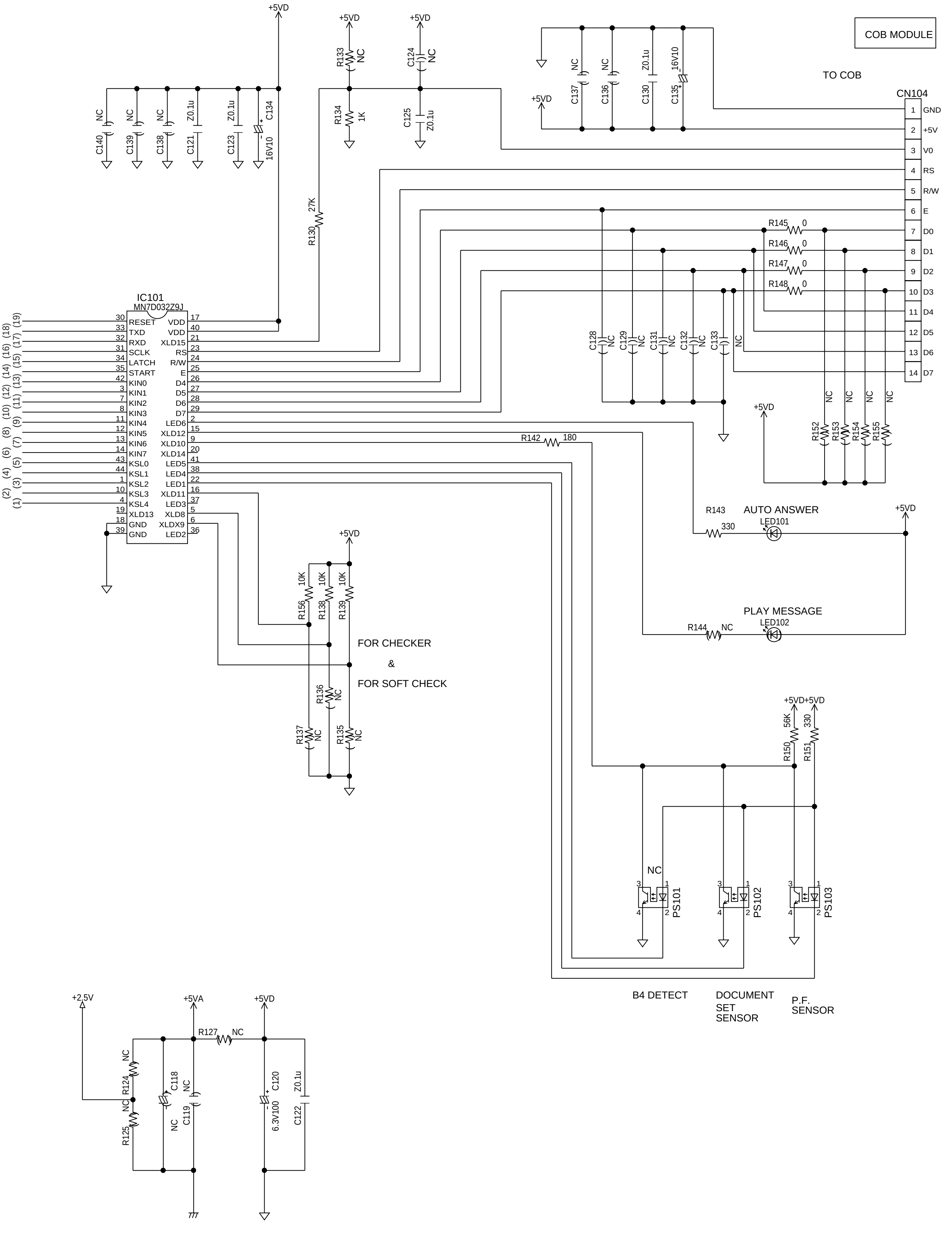

(6)
(5)
(4)
(3)
(2)
(1)
D201
R201
47
C206
1000P
C202
1000P
C201
470/35
R202
1.5K/2
R203
1.5K/2
27V
0
-80V
(L204)
(R229)
(C209)
C222
0.1
CN201
1 24V
2 24V
3 P GND
4 P GND
5 D GND
6 D GND
7 5V
8 5V
9 HTRON
10 PDET
(C223)
(C224)
(R206)
D202
C203
470/35
7.5V
0
-23V
R222
2.2K
R221
2.2K
PC101
C205
0.1/50
R223
100
IC201
VR201
5K
R224
27K
R225
3.3K
(D203)
IC202
C204
47/35
(L205)
(R208)
C210
0.1

KX-FLM551: SCHEMATIC DIAGRAM (LOW VOLTAGE POWER SUPPLY BOARD (PCB5))

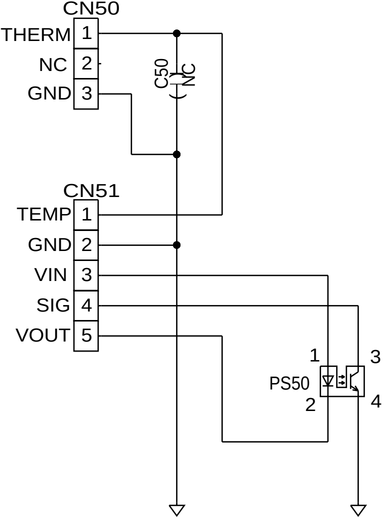

TO DIGITAL
J102
NC
J103
NC
CN101
FG 13
RESET 12
KRXD 11
KTXD 10
KSCLK 9
KLATCH 8
KSTART 7
JOG2 6
JOG1 5
GND 4
+5V 3
MICGND 2
SPMIC 1
R105 100
R111 100
R106 100
R112 100
R107 100
R113 100
JOG DIAL
SW142
1 JOG1
2 GND
3 JOG2
R103 1K
R101 1K
C141 Z0.1u
+5VD
NC C101
C102 NC
C110 K0.01u
C111 J100p
C115 J100p
C116 J100p
C117 J100p
(19) (18) (17) (16) (15) (14) (13) (12) (11) (10) (9) (8) (7) (6) (5) (4) (3) (2) (1)
R114 180
R116 180
R119 180
R120 180
R121 180
R122 180
R123 180
R126 180
9 SW101
VOL- SW105
AUTO ANSWER SW109
VOL+ SW113
FLASH SW117
# SW121
6 SW125
3 SW129
F2 SW102
F5 SW106
F4 SW110
NC IQ-FAX SW114
MONITOR SW118
F3 SW122
F1 SW126
HELP SW130
8 SW103
QUICK SCAN SW107
COLLATE SW111
RESOLUTION SW115
MUTE SW119
0 SW123
5 SW127
2 SW131
7 SW104
STOP SW108
START SW112
COPY SW116
REDIAL/PAUSE SW120
* SW124
4 SW128
1 SW132
NC ERASE SW133
NC PLAY SW134
MENU SW135
F6 SW136
SEARCH SW137
PRINT SW138
IQ-FAX/RECORD SW139
PRINT SW140
7
6
5
-1 IC102
+5VA
R104 NC
C106 NC
8
2
1
3
4
-2 IC102
R110 NC
R109 NC
C108 NC
C109 NC
C105 NC
R108 NC
C107 NC
+2.5V
+5VA
R117 NC
R118 NC
C113 NC
CN103
1 MIC+
2 MIC-
NC
R115 NC
C112 NC
C114 NC

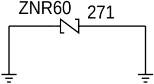

+5VD
C140
C139
C138
C121
C123
C134
NC
Z0.1u
16V10
R133
R134
1K
C124
C125
R130
27K
IC101
MN7D032Z9J
RESET
TXD
RXD
SCLK
LATCH
START
KIN0
KIN1
KIN2
KIN3
KIN4
KIN5
KIN6
KIN7
KSL0
KSL1
KSL2
KSL3
KSL4
XLD13
GND
VDD
XLD15
RS
R/W
E
D4
D5
D6
D7
LED6
XLD12
XLD10
XLD14
LED5
LED4
LED1
XLD11
LED3
XLD8
XLDX9
LED2
COB MODULE
TO COB
CN104
GND
+5V
V0
D0
D1
D2
D3
C137
C136
C130
C135
R145
R146
R147
R148
0
C128
C129
C131
C132
C133
R152
R153
R154
R155
R142
180
R143
330
AUTO ANSWER
LED101
PLAY MESSAGE
R144
LED102
R156
R138
R139
10K
FOR CHECKER
&
FOR SOFT CHECK
R136
R137
R135
R150
56K
R151
PS101
PS102
PS103
B4 DETECT
DOCUMENT
SET
SENSOR
P.F.
SENSOR
+2.5V
+5VA
R127
R124
R125
C118
C119
C120
6.3V100
C122

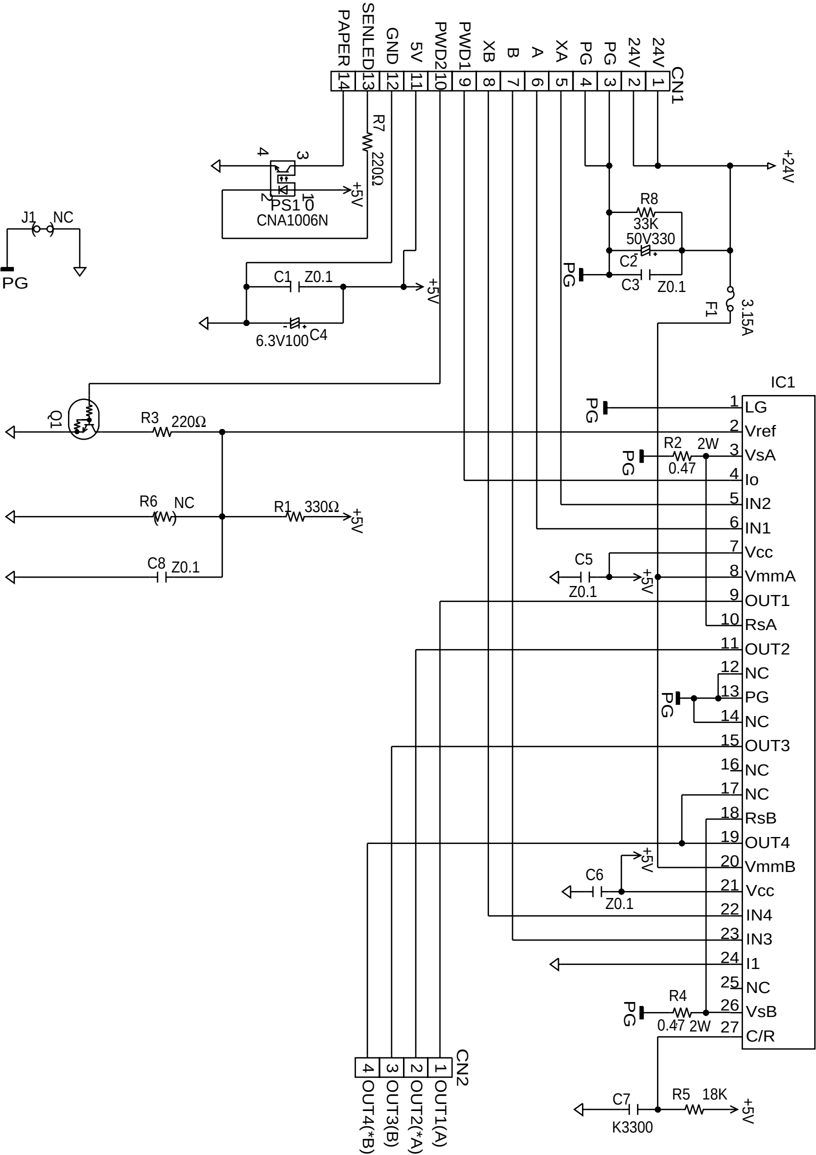
KX-FLM551: SCHEMATIC DIAGRAM (OPERATION BOARD (PCB3))

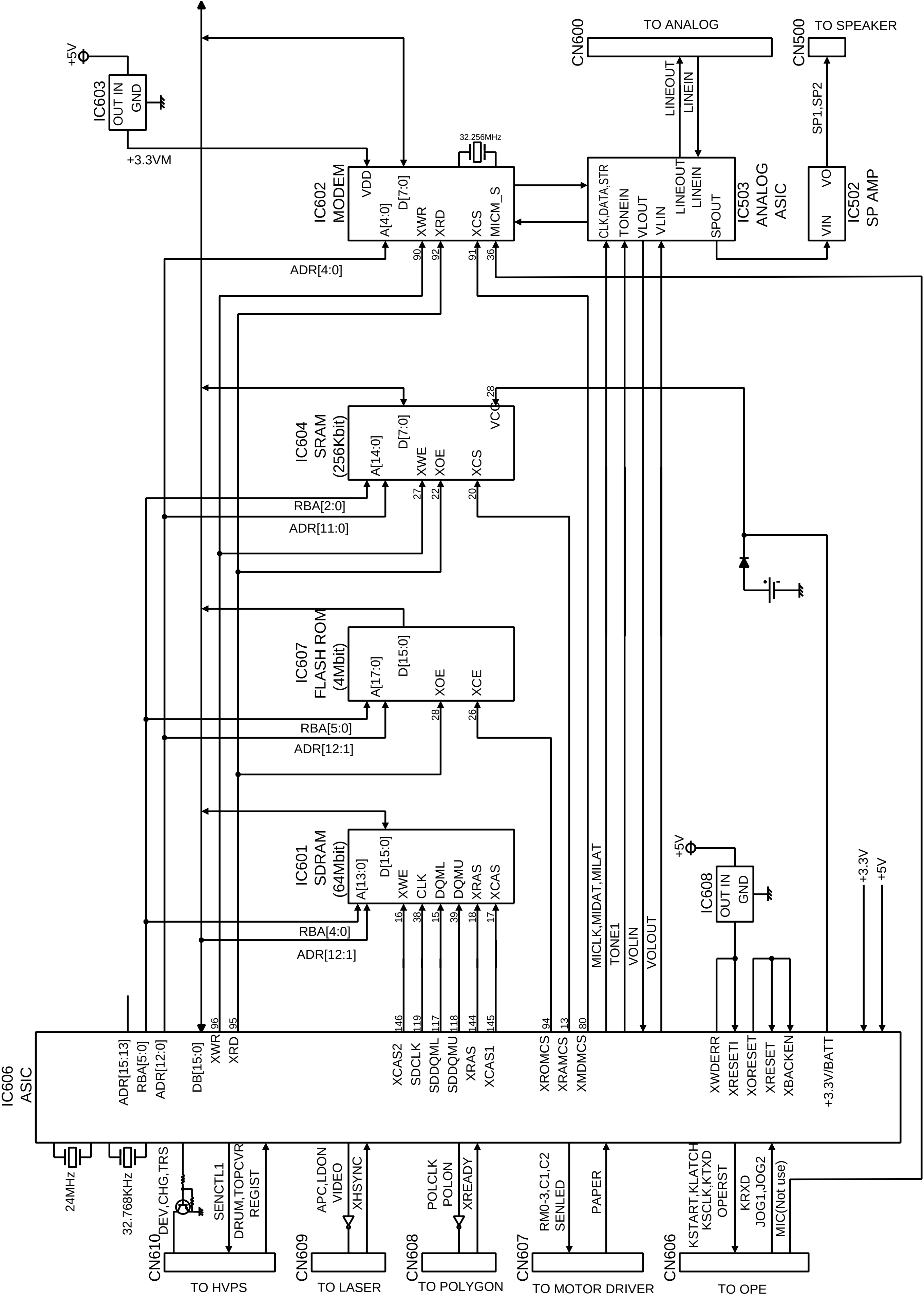

COB MODULE
TO COB
CN104
1 GND
2 +5V
3 V0
4 RS
5 R/W
6 E
7 D0
8 D1
9 D2
10 D3
11 D4
12 D5
13 D6
14 D7
+5VD
C140 NC
C139 NC
C138 NC
C121 Z0.1u
C123 Z0.1u
C134 16V10
R133 NC
R134 1K
C124 NC
C125 Z0.1u
C137 NC
C136 NC
C130 Z0.1u
C135 16V10
R130 27K
IC101
MN7D032Z9J
30 RESET
33 TXD
32 RXD
31 SCLK
34 LATCH
35 START
42 KIN0
3 KIN1
7 KIN2
8 KIN3
11 KIN4
12 KIN5
13 KIN6
14 KIN7
43 KSL0
44 KSL1
1 KSL2
10 KSL3
4 KSL4
19 XLD13
18 GND
39 GND
17 VDD
40 VDD
21 XLD15
23 RS
24 R/W
25 E
26 D4
27 D5
28 D6
29 D7
2 LED6
15 XLD12
9 XLD10
20 XLD14
41 LED5
38 LED4
22 LED1
16 XLD11
37 LED3
5 XLD8
6 XLDX9
36 LED2
(19) (18) (17) (16) (15) (14) (13) (12) (11) (10) (9) (8) (7) (6) (5) (4) (3) (2) (1)
R145 0
R146 0
R147 0
R148 0
C128 NC
C129 NC
C131 NC
C132 NC
C133 NC
R152 NC
R153 NC
R154 NC
R155 NC
R142 180
R143 330
AUTO ANSWER
LED101
PLAY MESSAGE
R144 NC
LED102
R156 10K
R138 10K
R139 10K
R136 NC
R137 NC
R135 NC
FOR CHECKER
&
FOR SOFT CHECK
R150 56K
R151 330
+5VD+5VD
NC
PS101
PS102
PS103
B4 DETECT
DOCUMENT SET SENSOR
P.F. SENSOR
+2.5V
+5VA
R124 NC
R125 NC
C118 NC
C119 NC
R127 NC
C120 6.3V100
C122 Z0.1u

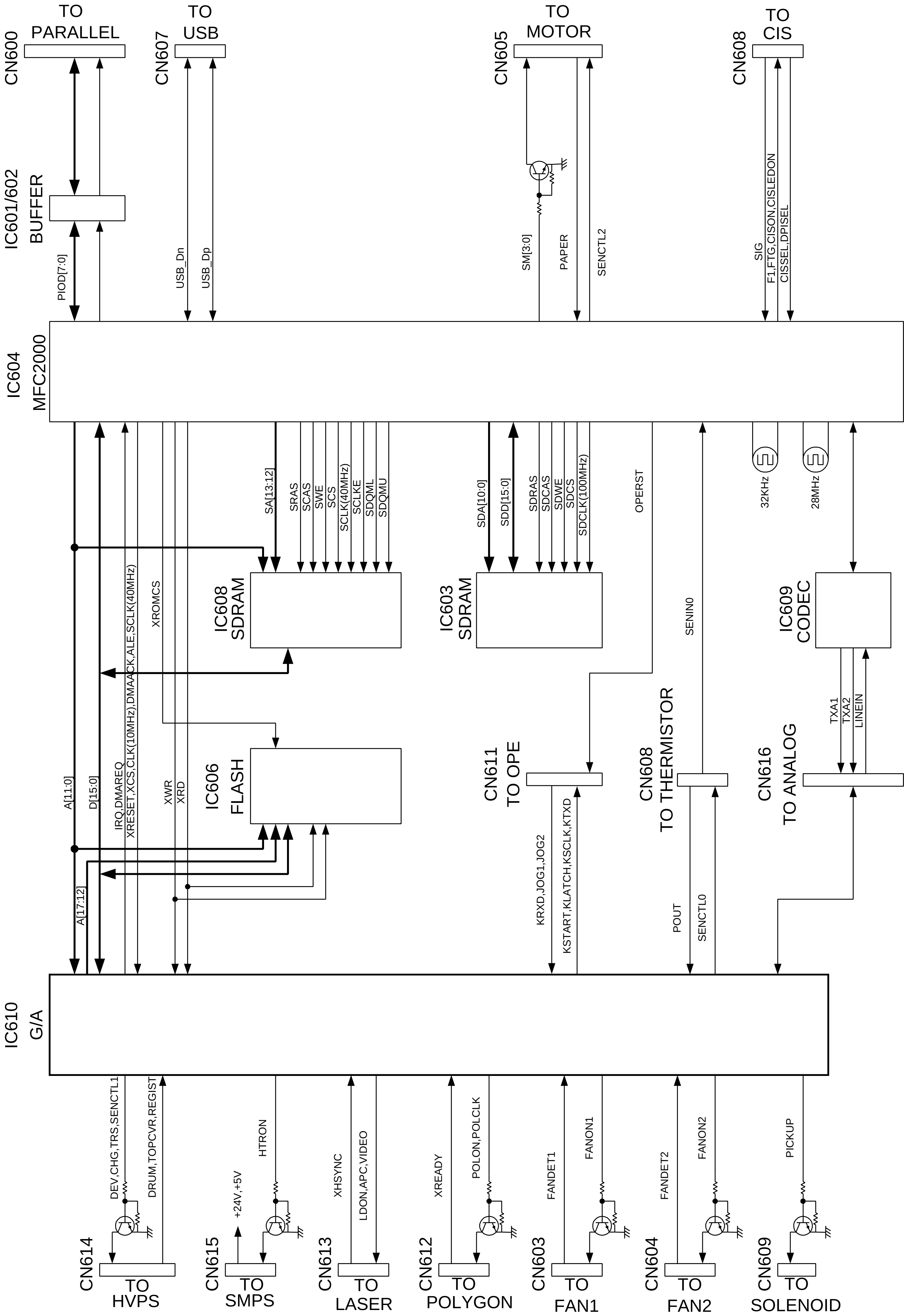
KX-FLM551: SCHEMATIC DIAGRAM (OPERATION BOARD (PCB3))

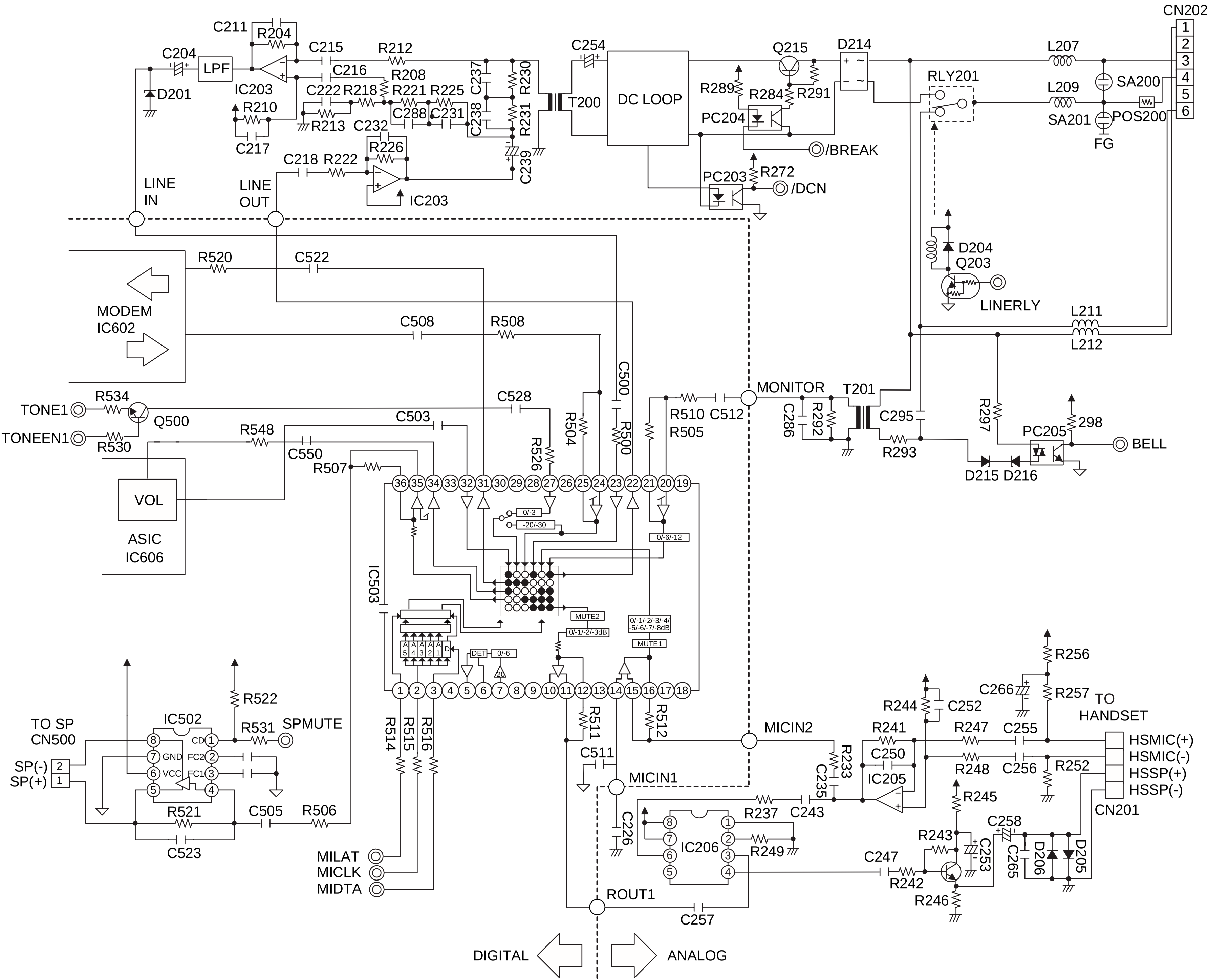

CN50
THERM 1
NC 2
GND 3
C50
NC
CN51
TEMP 1
GND 2
VIN 3
SIG 4
VOUT 5
1
3
PS50
2
4


ZNR60
271

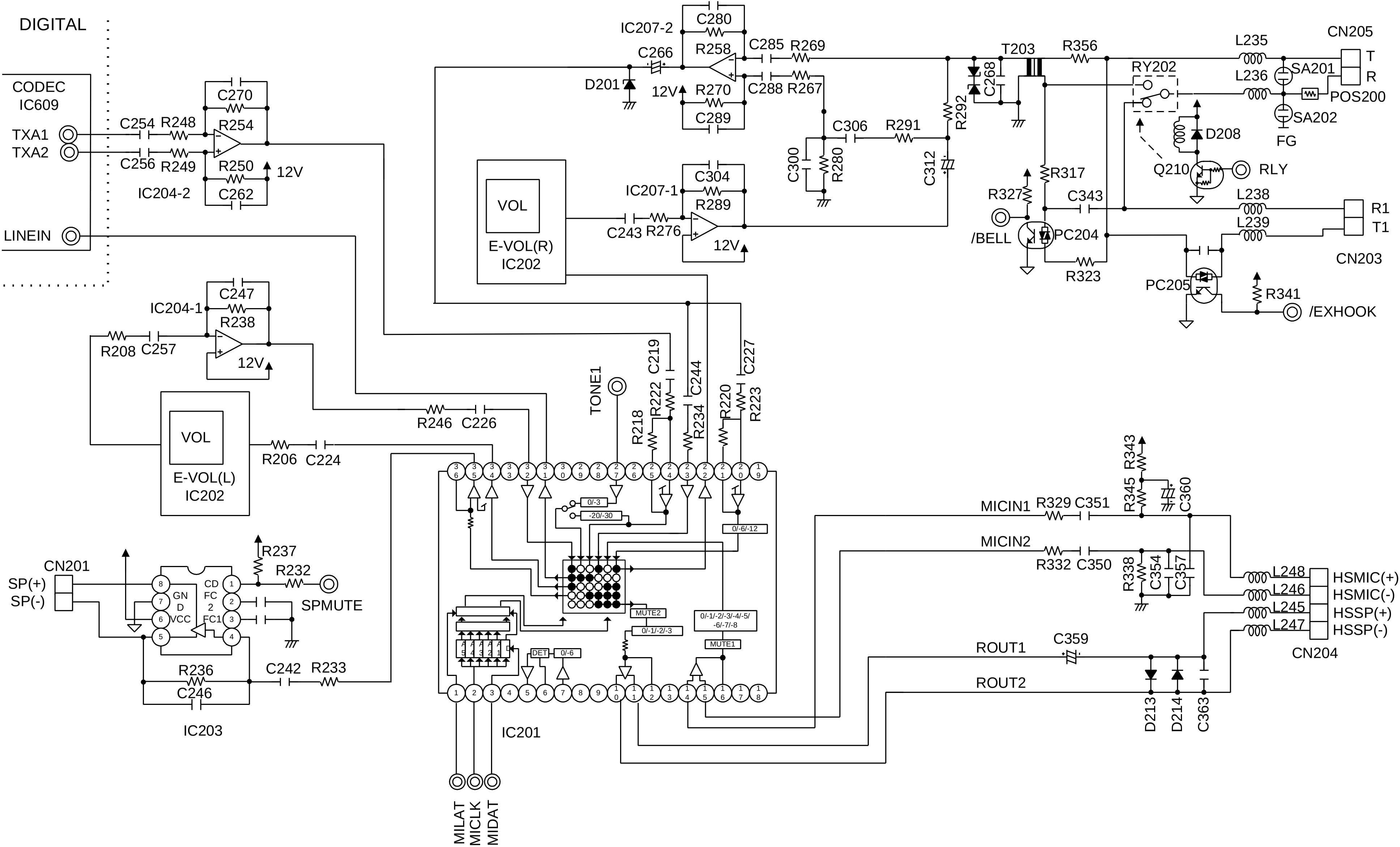

CN1
1 24V
2 24V
3 PG
4 PG
5 XA
6 A
7 B
8 XB
9 PWD1
10 PWD2
11 5V
12 GND
13 SENLED
14 PAPER
R7
220Ω
4
3
2
1
0
PS1
CNA1006N
+5V
J1
NC
PG
+24V
R8
33K
50V330
C2
C3
Z0.1
PG
F1
3.15A
C1
Z0.1
+5V
C4
6.3V100
Q1
R3
220Ω
R6
NC
R1
330Ω
+5V
C8
Z0.1
IC1
1 LG
2 Vref
3 VsA
4 Io
5 IN2
6 IN1
7 Vcc
8 VmmA
9 OUT1
10 RsA
11 OUT2
12 NC
13 PG
14 NC
15 OUT3
16 NC
17 NC
18 RsB
19 OUT4
20 VmmB
21 Vcc
22 IN4
23 IN3
24 I1
25 NC
26 VsB
27 C/R
PG
R2
2W
0.47
PG
C5
Z0.1
+5V
PG
C6
+5V
Z0.1
R4
PG
0.47
2W
CN2
1 OUT1(A)
2 OUT2(*A)
3 OUT3(B)
4 OUT4(*B)
C7
K3300
R5
18K
+5V

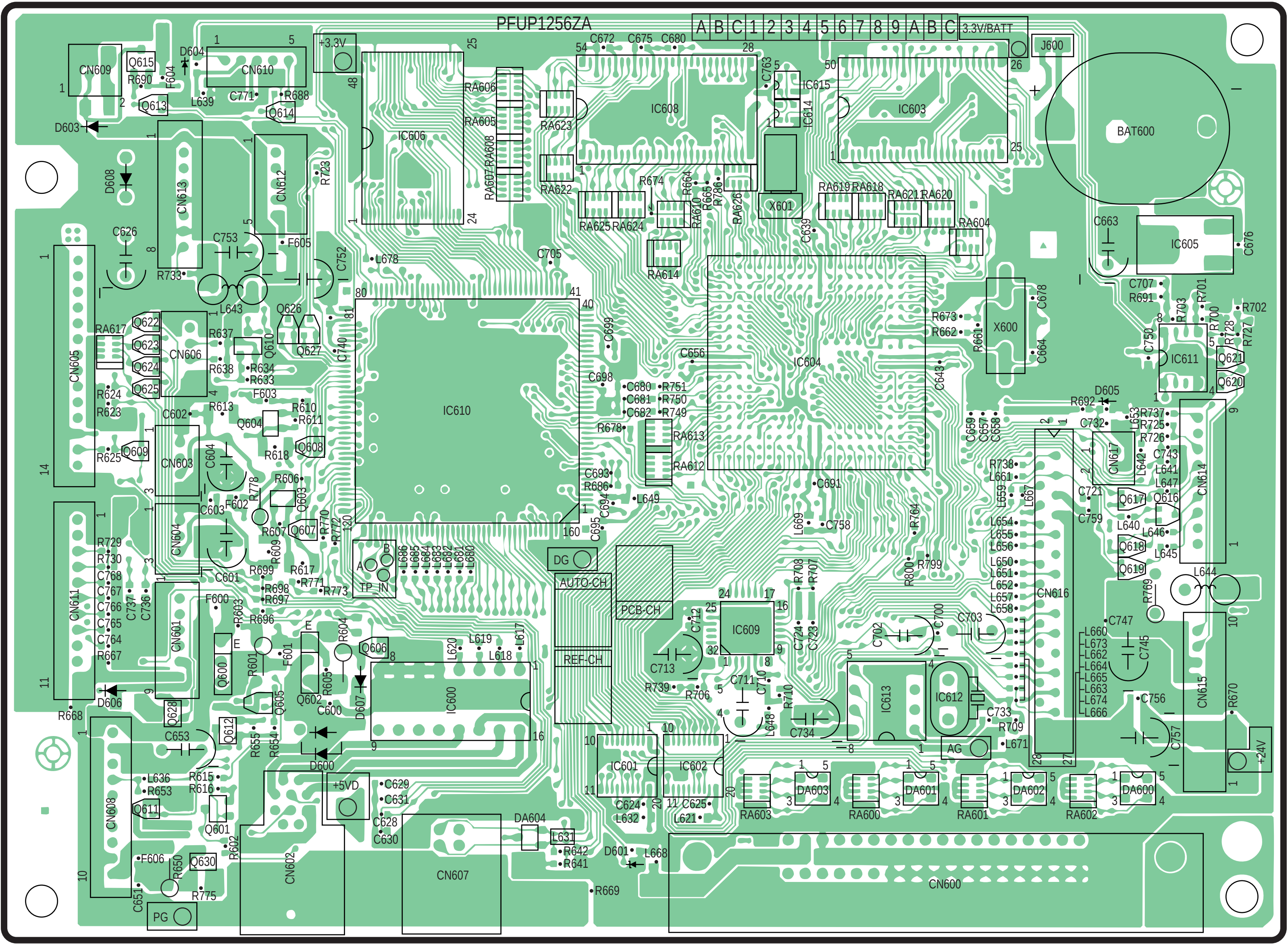

IC606
ASIC
ADR[15:13]
RBA[5:0]
ADR[12:0]
DB[15:0]
XWR
XRD
96
95
XCAS2
SDCLK
SDDQML
SDDQMU
XRAS
XCAS1
146
119
117
118
144
145
XROMCS
XRAMCS
XMDMCS
94
13
80
XWDERR
XRESETI
XORESET
XRESET
XBACKEN
+3.3V/BATT
+3.3V
+5V
IC602
MODEM
VDD
D[7:0]
A[4:0]
XWR
XRD
XCS
MICM_S
90
92
91
36
32.256MHz
ADR[4:0]
IC603
OUT IN
GND
+5V
+3.3VM
CN600
TO ANALOG
LINEOUT
LINEIN
CN500
TO SPEAKER
SP1,SP2
IC503
ANALOG
ASIC
CLK,DATA,STR
TONEIN
VLOUT
VLIN
LINEOUT
LINEIN
SPOUT
IC502
SP AMP
VO
VIN
IC604
SRAM
(256Kbit)
A[14:0]
D[7:0]
XWE
XOE
XCS
VCC
28
27
22
20
RBA[2:0]
ADR[11:0]
IC607
FLASH ROM
(4Mbit)
A[17:0]
D[15:0]
XOE
XCE
28
26
RBA[5:0]
ADR[12:1]
IC601
SDRAM
(64Mbit)
A[13:0]
D[15:0]
XWE
CLK
DQML
DQMU
XRAS
XCAS
16
38
15
39
18
17
RBA[4:0]
ADR[12:1]
MICLK,MIDAT,MILAT
TONE1
VOLIN
VOLOUT
IC608
OUT IN
GND
+5V
24MHz
32.768KHz
DEV,CHG,TRS
SENCTL1
DRUM,TOPCVR
REGIST
CN610
TO HVPS
APC,LDON
VIDEO
XHSYNC
CN609
TO LASER
POLCLK
POLON
XREADY
CN608
TO POLYGON
RM0-3,C1,C2
SENLED
PAPER
CN607
TO MOTOR DRIVER
KSTART,KLATCH
KSCLK,KTXD
OPERST
KRXD
JOG1,JOG2
MIC(Not use)
CN606
TO OPE


TO PARALLEL
CN600
TO USB
CN607
TO MOTOR
CN605
TO CIS
CN608
IC601/602
BUFFER
PIOD[7:0]
USB_Dn
USB_Dp
SM[3:0]
PAPER
SENCTL2
SIG
F1,FTG,CISON,CISLEDON
CISSEL,DPISEL
IC604
MFC2000
SA[13:12]
SRAS
SCAS
SWE
SCS
SCLK(40MHz)
SCLKE
SDQML
SDQMU
SDA[10:0]
SDD[15:0]
SDRAS
SDCAS
SDWE
SDCS
SDCLK(100MHz)
OPERST
32KHz
28MHz
IC608
SDRAM
IC603
SDRAM
IC609
CODEC
XROMCS
XRESET,XCS,CLK(10MHz),DMAACK,ALE,SCLK(40MHz)
IRQ,DMAREQ
SENIN0
TXA1
TXA2
LINEIN
IC606
FLASH
CN611
TO OPE
CN608
TO THERMISTOR
CN616
TO ANALOG
A[11:0]
D[15:0]
XWR
XRD
A[17:12]
KRXD,JOG1,JOG2
KSTART,KLATCH,KSCLK,KTXD
POUT
SENCTL0
IC610
G/A
DEV,CHG,TRS,SENCTL1
DRUM,TOPCVR,REGIST
+24V,+5V
HTRON
XHSYNC
LDON,APC,VIDEO
XREADY
POLON,POLCLK
FANDET1
FANON1
FANDET2
FANON2
PICKUP
CN614
TO HVPS
CN615
TO SMPS
CN613
TO LASER
CN612
TO POLYGON
CN603
TO FAN1
CN604
TO FAN2
CN609
TO SOLENOID



C211
R204
C204
LPF
C215
R212
C216
R208
IC203
D201
C222
R218
R221
R225
C237
R230
R210
C288
C231
C238
R231
R213
C232
C217
R226
C218
R222
C239
IC203
C254
T200
DC LOOP
Q215
D214
R289
R284
R291
PC204
/BREAK
PC203
R272
/DCN
L207
L209
SA200
SA201
POS200
FG
RLY201
CN202
1
2
3
4
5
6
D204
Q203
LINERLY
L211
L212
LINE IN
LINE OUT
MODEM IC602
R520
C522
C508
R508
C500
R500
R504
MONITOR
T201
C286
R292
C295
R293
R510
C512
R505
R297
PC205
298
BELL
D215
D216
TONE1
R534
Q500
TONEEN1
R530
C528
C503
R526
R548
C550
R507
VOL
ASIC IC606
36 35 34 33 32 31 30 29 28 27 26 25 24 23 22 21 20 19
0/-3
-20/-30
0/-6/-12
IC503
MUTE2
0/-1/-2/-3dB
0/-1/-2/-3-4/-5/-6/-7/-8dB
MUTE1
A5 A4 A3 A2 A1 D
DET
0/-6
20
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18
R514
R515
R516
R511
R512
MILAT
MICLK
MIDTA
TO SP CN500
SP(-)
SP(+)
2
1
IC502
R522
R531
SPMUTE
CD
FC2
FC1
GND
VCC
R521
C505
R506
C523
C511
MICIN1
MICIN2
C226
ROUT1
C257
DIGITAL
ANALOG
R237
C243
R233
C235
IC206
R249
R241
C250
IC205
R244
C252
R247
C255
R248
C256
R256
C266
R257
TO HANDSET
HSMIC(+)
HSMIC(-)
HSSP(+)
HSSP(-)
CN201
R252
R245
C258
C253
C265
D206
D205
R243
C247
R242
R246


DIGITAL
CODEC
IC609
TXA1
TXA2
LINEIN
C254
R248
C256
R249
C270
R254
R250
12V
IC204-2
C262
C247
IC204-1
R238
R208
C257
12V
VOL
E-VOL(L)
IC202
R206
C224
VOL
E-VOL(R)
IC202
C243
R276
IC207-1
C304
R289
12V
IC207-2
C280
R258
C266
D201
12V
R270
C289
C285
R269
C288
R267
C306
R291
C300
R280
C312
R292
C268
T203
R356
R317
R327
/BELL
PC204
C343
R323
L235
L236
CN205
T
R
SA201
POS200
SA202
FG
RY202
D208
Q210
RLY
L238
L239
R1
T1
CN203
PC205
R341
/EXHOOK
TONE1
C219
R222
R218
C244
R234
R220
C227
R223
R246
C226
0/-3
-20/-30
0/-6/-12
MUTE2
0/-1/-2/-3
0/-1/-2/-3/-4/-5/-6/-7/-8
MUTE1
DET
0/-6
IC201
MILAT
MICLK
MIDAT
CN201
SP(+)
SP(-)
GND
VCC
CD
FC2
FC1
R237
R232
SPMUTE
R236
C246
C242
R233
IC203
MICIN1
R329
C351
R345
R343
C360
MICIN2
R332
C350
R338
C354
C357
L248
L246
L245
L247
HSMIC(+)
HSMIC(-)
HSSP(+)
HSSP(-)
CN204
ROUT1
C359
ROUT2
D213
D214
C363


PFUP1256ZA
A B C 1 2 3 4 5 6 7 8 9 A B C
3.3V/BATT
J600
BAT600
+3.3V
CN609
Q615
R690
F604
D604
CN610
C771
R688
L639
Q613
Q614
D603
D608
CN613
CN612
R723
IC606
RA606
RA605
RA607
RA608
RA623
RA622
IC608
C672
C675
C680
C763
IC615
IC614
IC603
X601
R674
R664
R665
R736
R610
RA626
RA625
RA624
RA619
RA618
RA621
RA620
RA604
RA614
C639
C663
IC605
C676
C626
C753
F605
C752
L678
C705
R733
L643
Q626
Q627
Q610
C740
IC610
IC604
C656
C698
C699
RA617
Q622
Q623
Q624
Q625
CN606
CN605
R637
R638
R634
R633
F603
R624
R623
R613
C602
Q604
R610
R611
Q608
R618
R625
Q609
CN603
C604
R778
R606
Q603
F602
C603
Q607
R607
R609
R770
R772
CN604
C601
R699
R617
R771
R773
R698
R697
R696
CN611
R729
R730
C768
C767
C766
C765
C764
C737
C736
R667
CN601
F600
R603
Q600
R601
F601
R604
Q606
Q602
R605
C600
D607
IC600
L619
L618
L617
L620
D606
R668
Q628
C653
Q612
Q605
R655
R654
D600
L636
R653
R615
R616
Q611
Q601
CN608
F606
R650
Q630
R602
R775
C651
PG
CN602
+5VD
C629
C631
C628
C630
CN607
DA604
L631
R642
R641
D601
L668
R669
CN600
TP_IN
A
B
L686
L685
L684
L683
L682
L681
L680
DG
AUTO-CH
PCB-CH
REF-CH
C680
C681
C682
R751
R750
R749
R678
RA613
RA612
C693
R686
C694
C695
L649
C691
C758
L669
R764
R800
R799
R708
R707
IC609
C712
C713
R739
R706
C711
C710
R710
L648
C724
C723
C734
C702
C700
C703
IC613
IC612
C733
R709
L671
AG
IC601
IC602
C624
L632
C625
L621
RA603
DA603
RA600
DA601
RA601
DA602
RA602
DA600
R673
R662
R661
X600
C678
C664
C643
C659
C657
C658
R738
L661
L659
L667
L654
L655
L656
L650
L651
L652
L657
L658
CN616
L660
L673
L662
L664
L665
L663
L674
L666
C747
C745
C756
C757
C707
R691
R703
R701
R700
R702
R728
R727
C750
IC611
Q621
Q620
D605
R692
L653
R737
R725
R726
C732
CN617
L642
C743
L641
L647
C721
Q617
Q616
C759
L640
L646
Q618
L645
Q619
CN614
L644
R769
CN615
R670
+24V